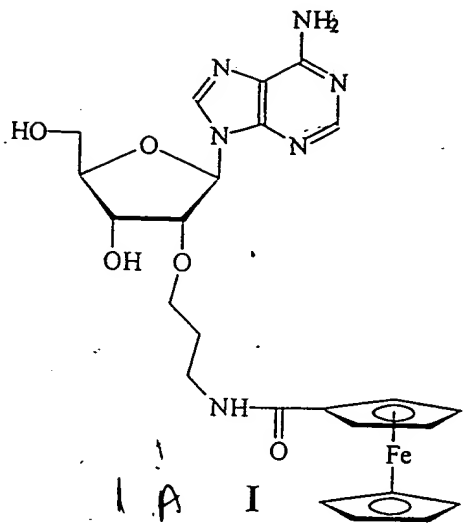
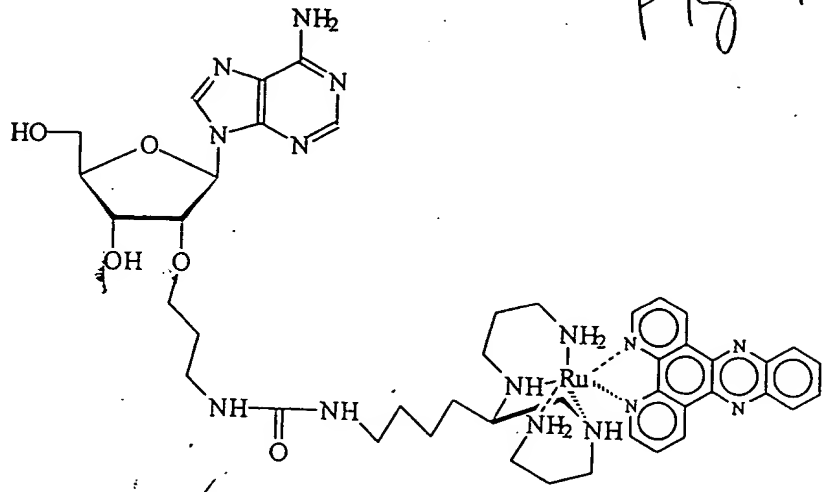
List of Metal nplexes for Compariso

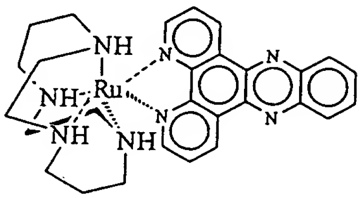
Fig 1



1A I

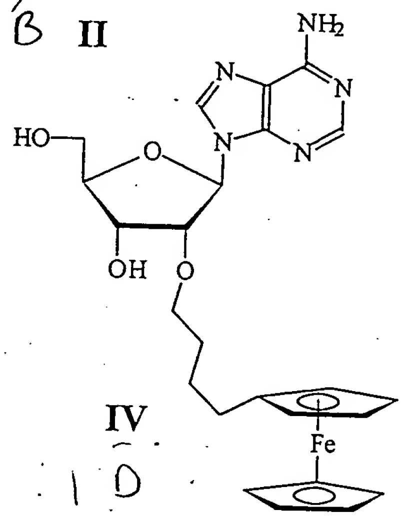


1B II



III

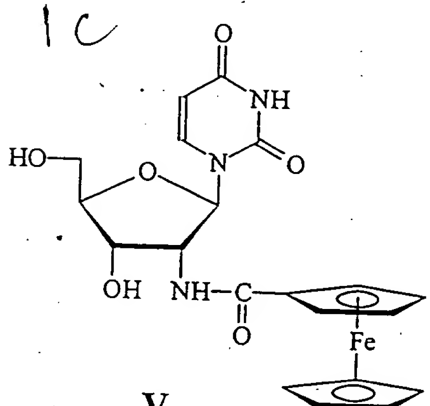
1C



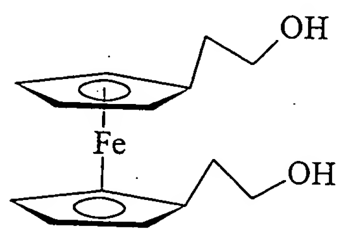
IV

1D

= N6

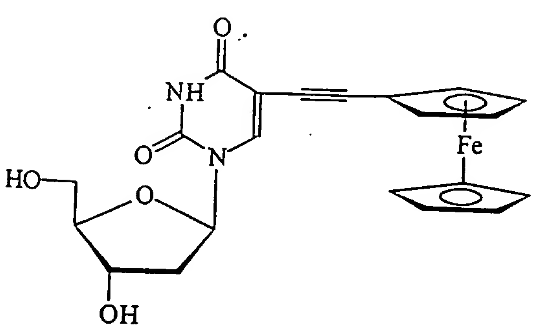


1E V



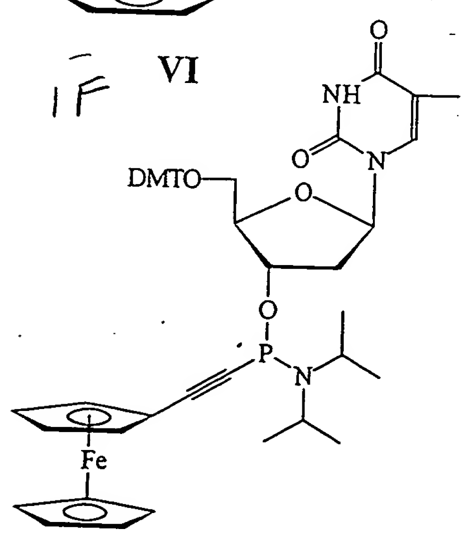
= C23

1F VI



VII

1G

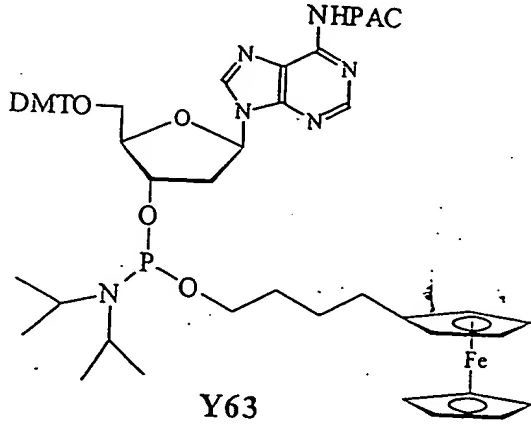


VIII

1H

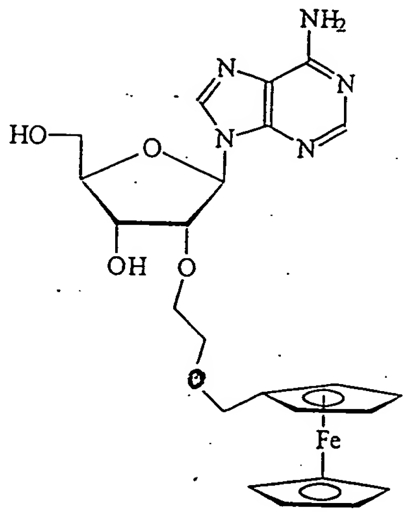
2/18/98

Fig 1 (Cont.)



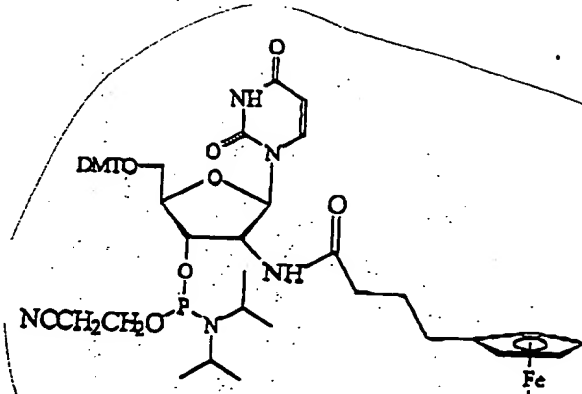
Y63

1.I



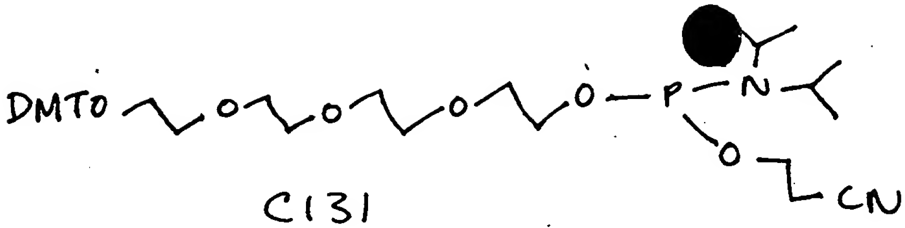
1.J

1.K



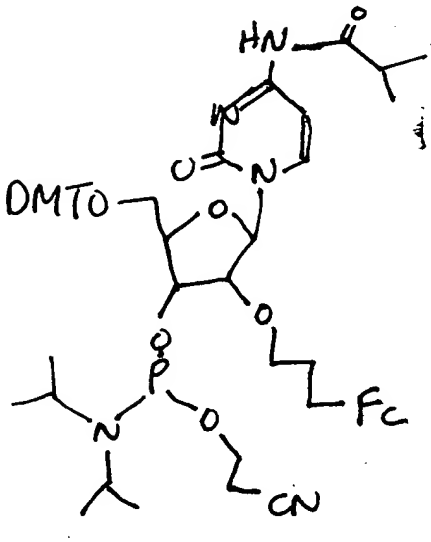
N11

1 L



C131

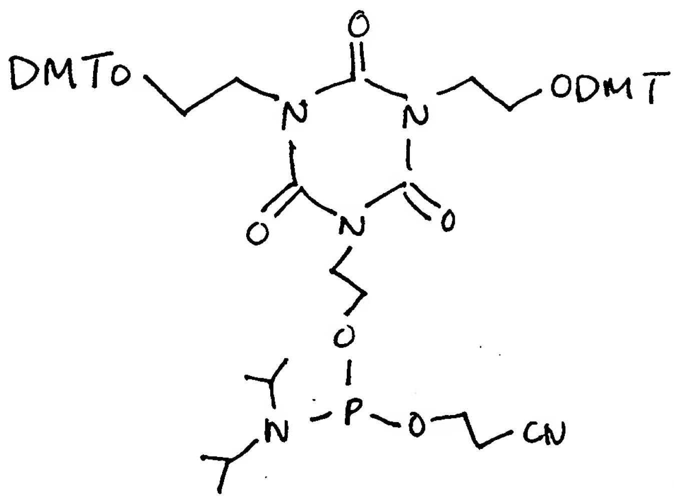
1 M



W38

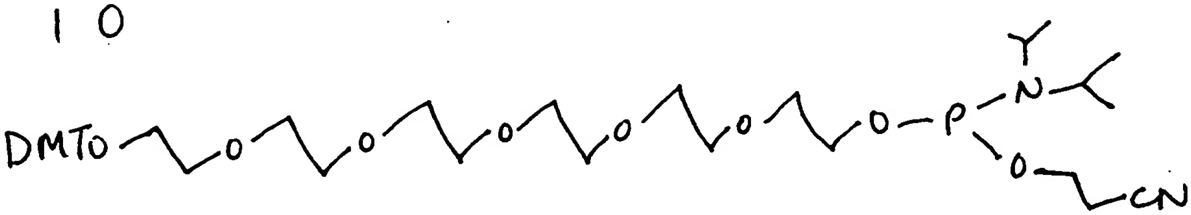
Fig 1 (Cont.)

1 N



branching

1 O



glen

Synthesis Scheme of Adenosine Ferrocene

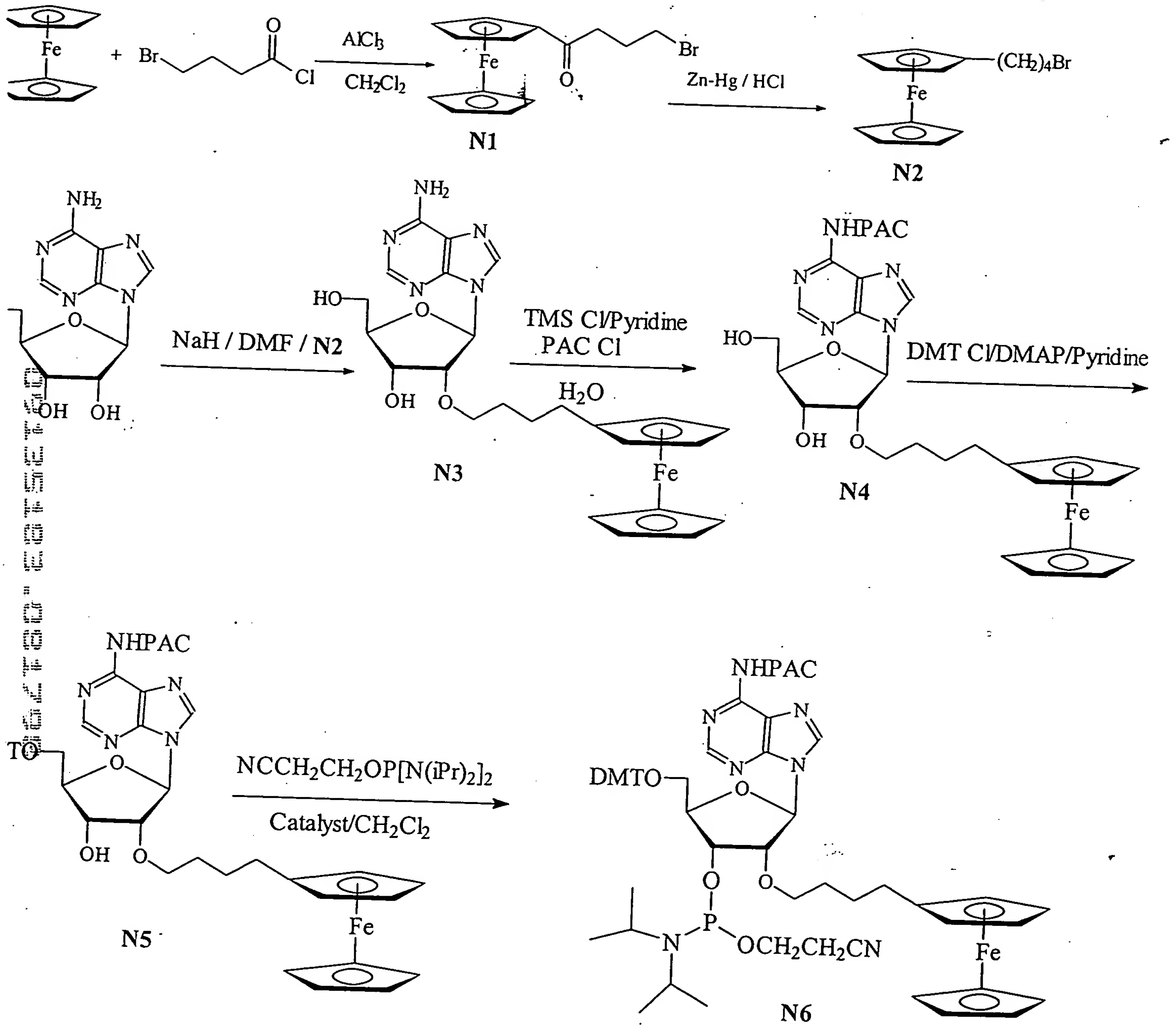


FIG. 2

Synthesis Scheme of Cytidine Ferrocene

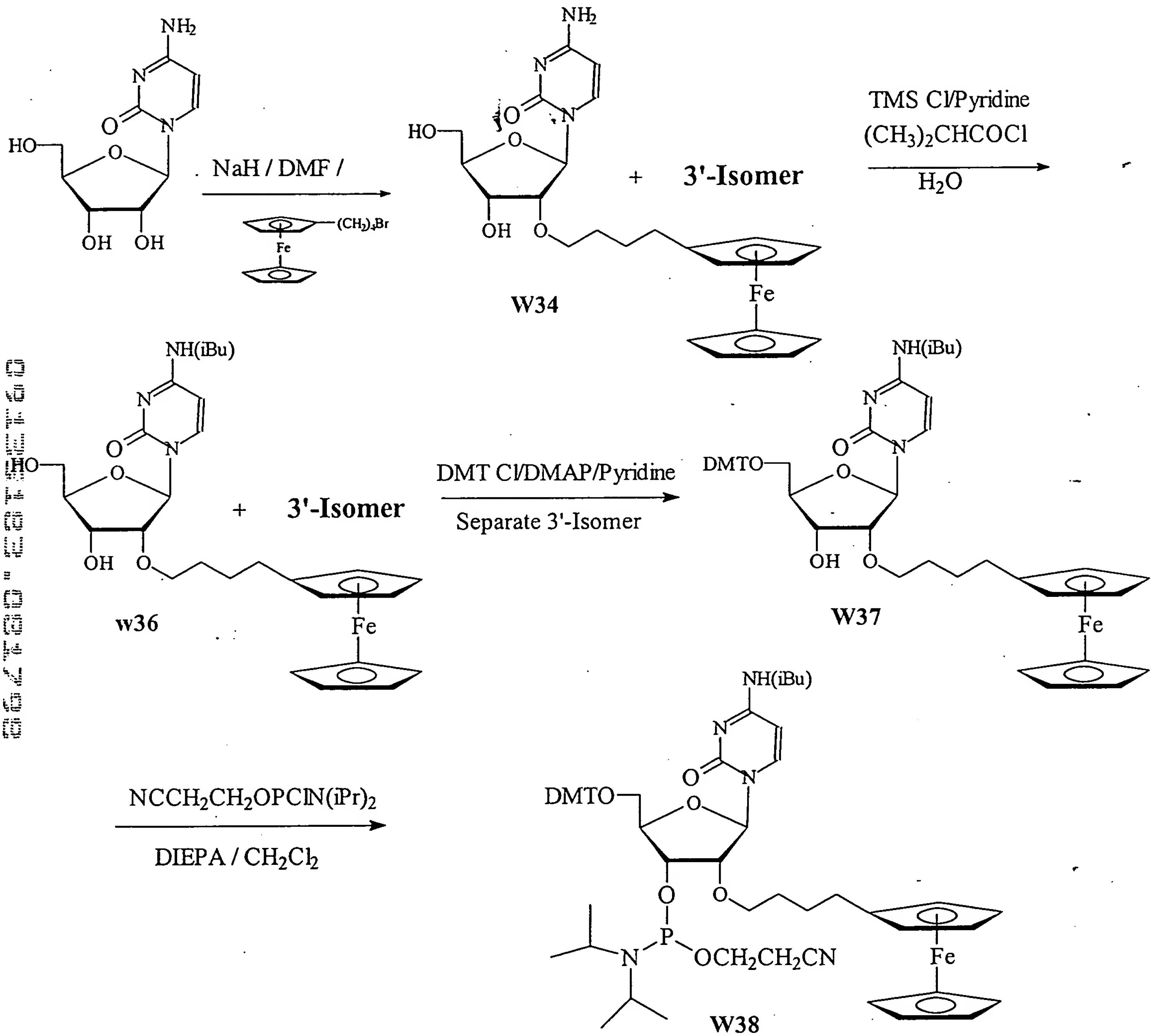
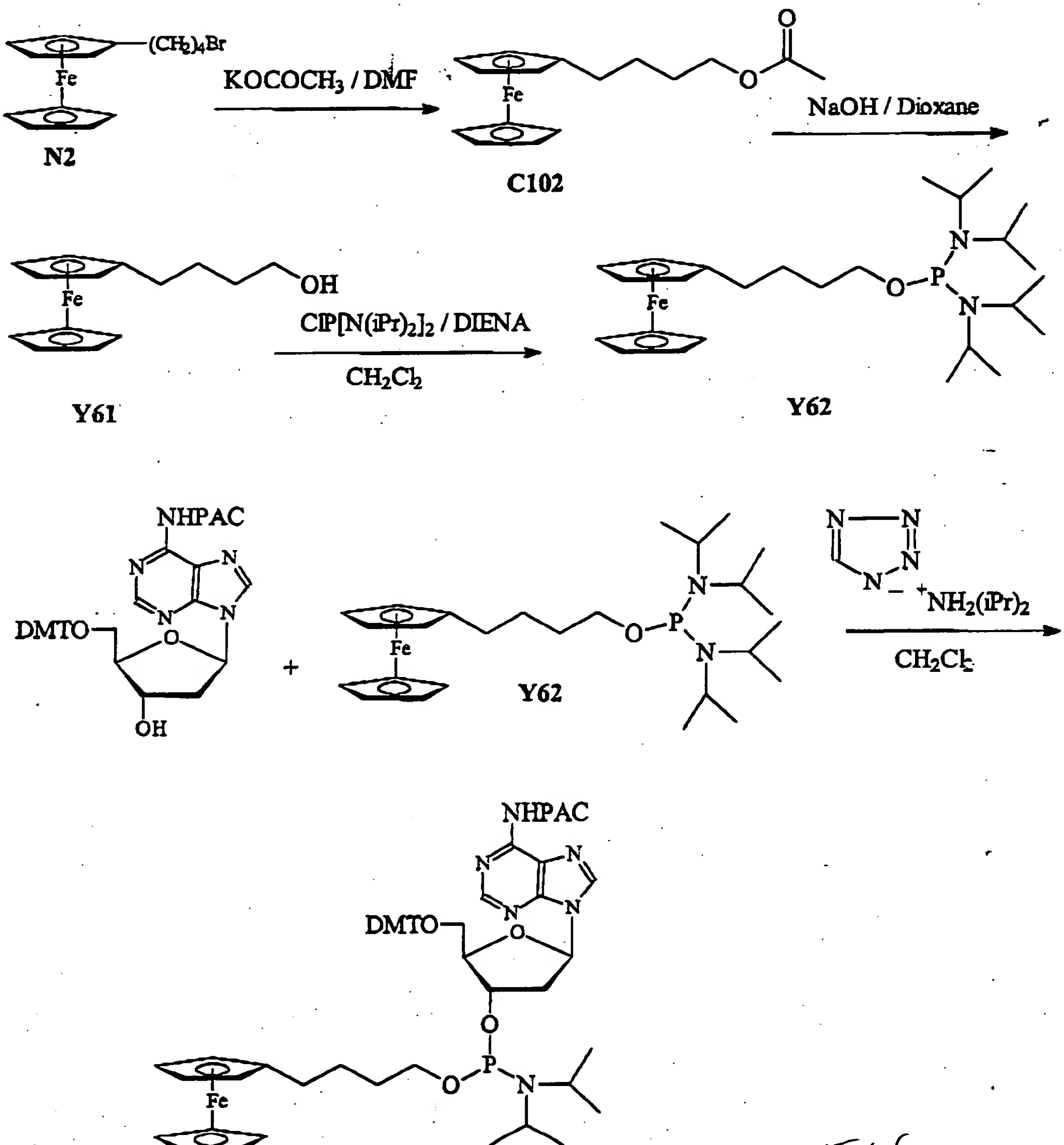


FIG. 3

Synthesis Scheme of Y63



Y63

FIG. 4

Synthesis f Adenosine Ferrocene Triphosphate

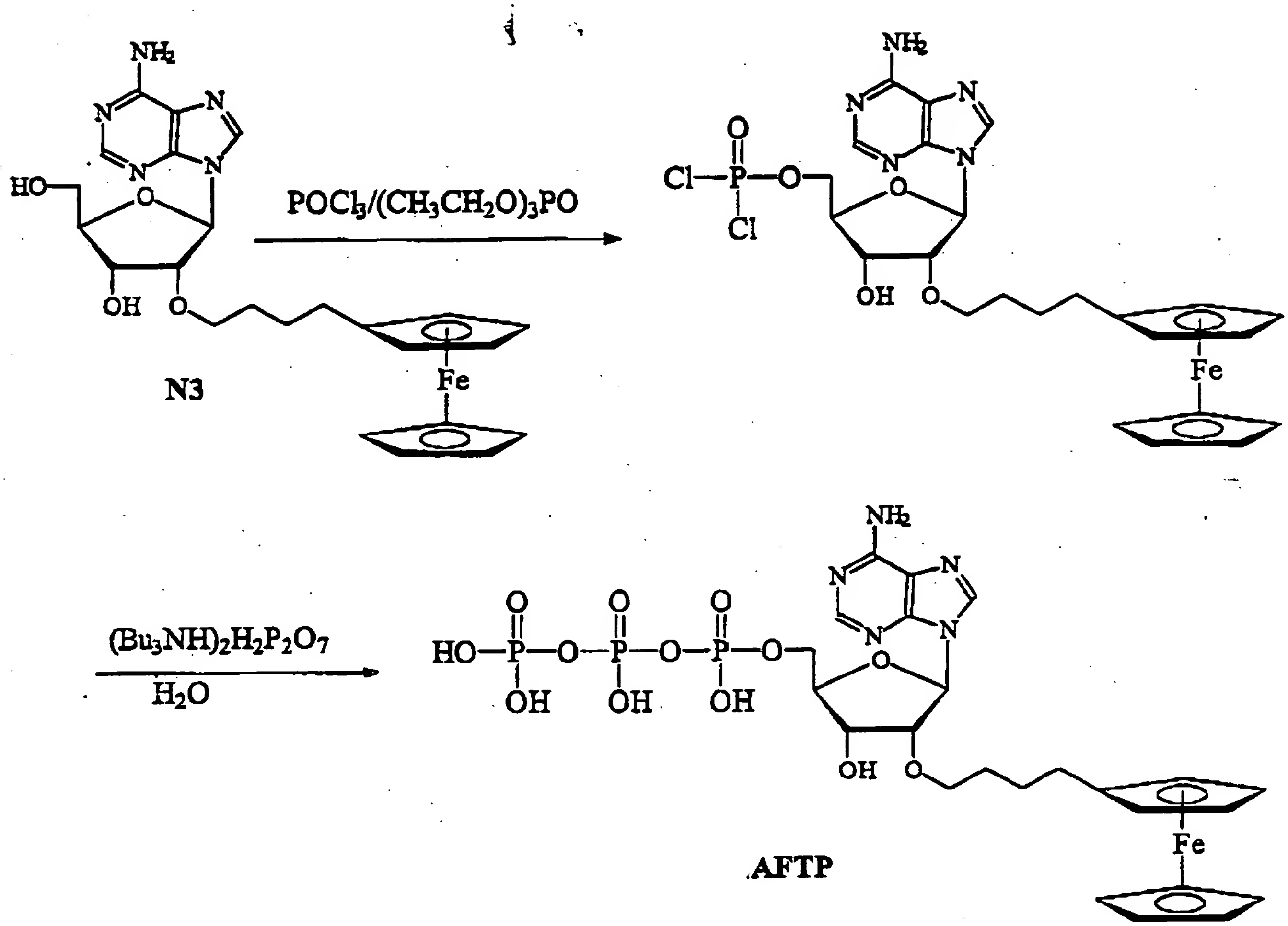


FIG. 5

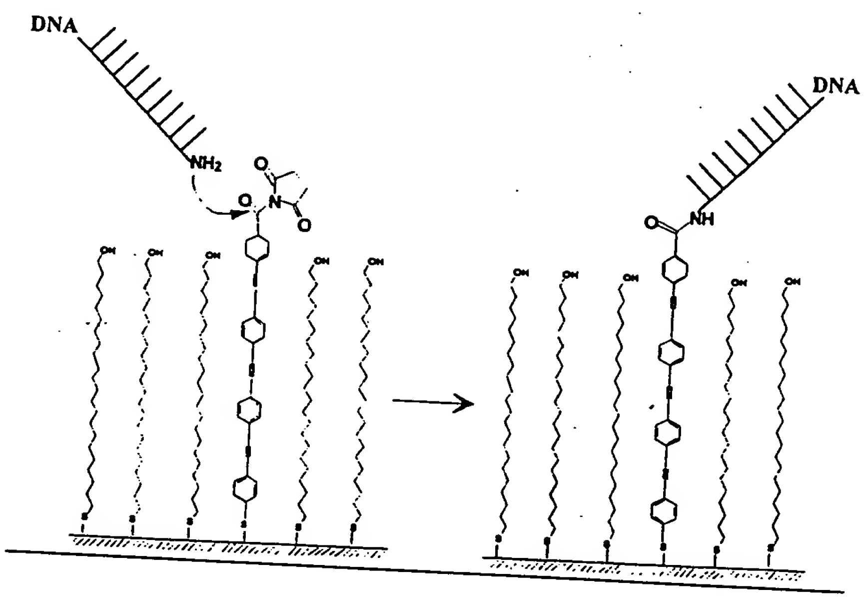
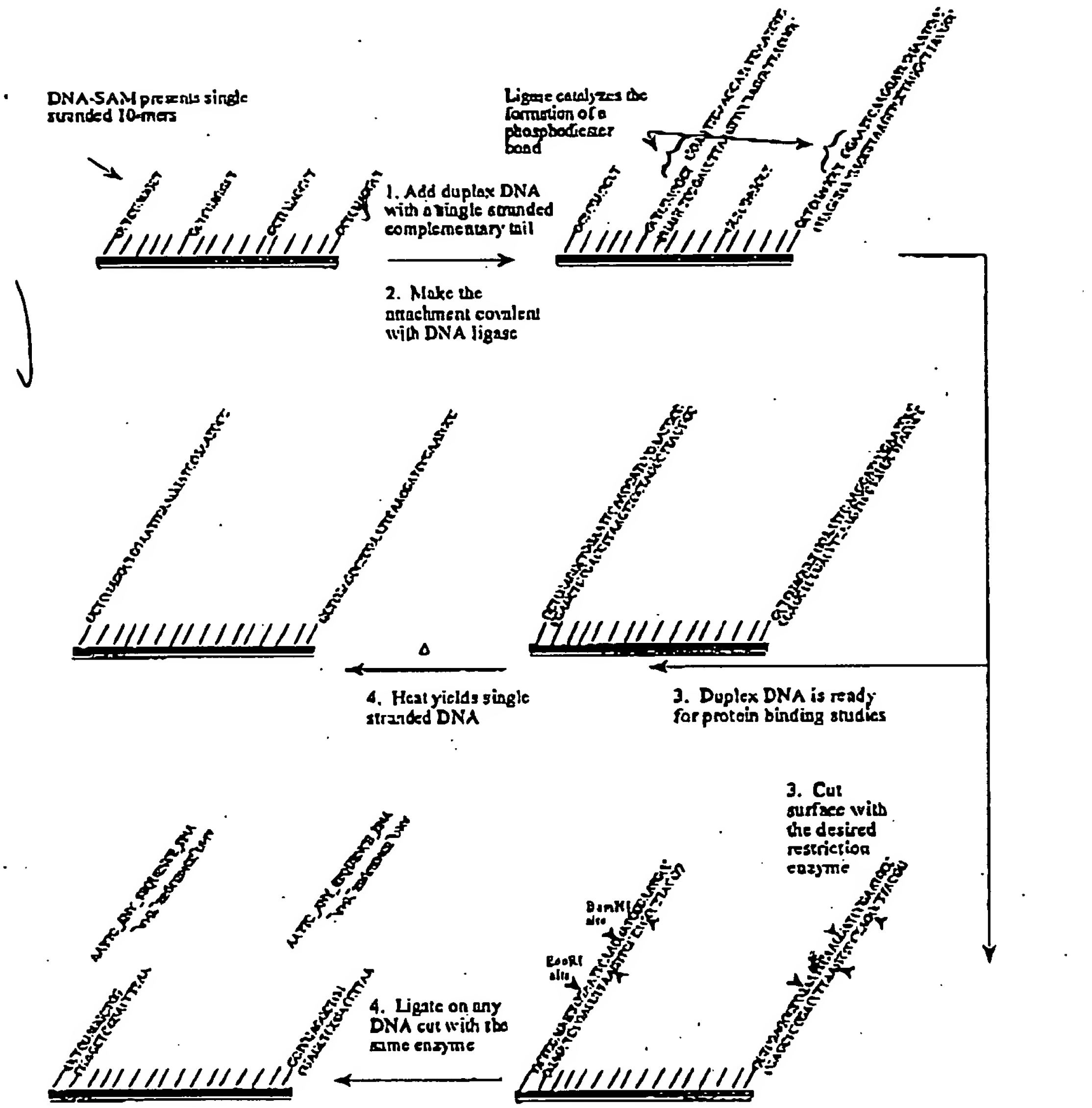
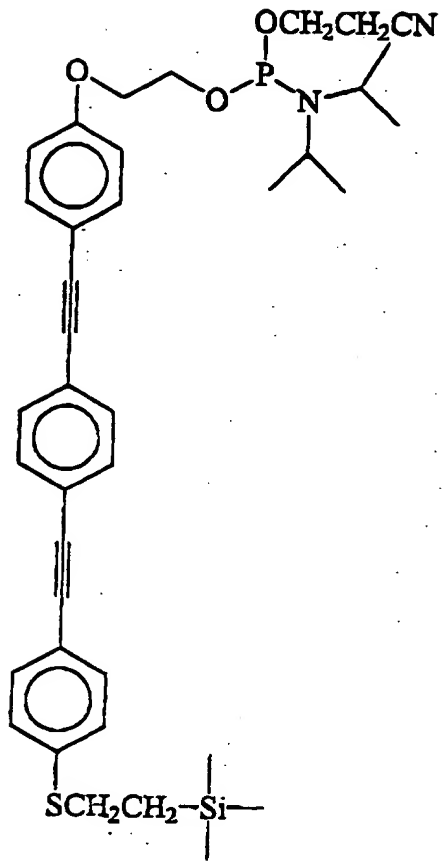


FIG. 6



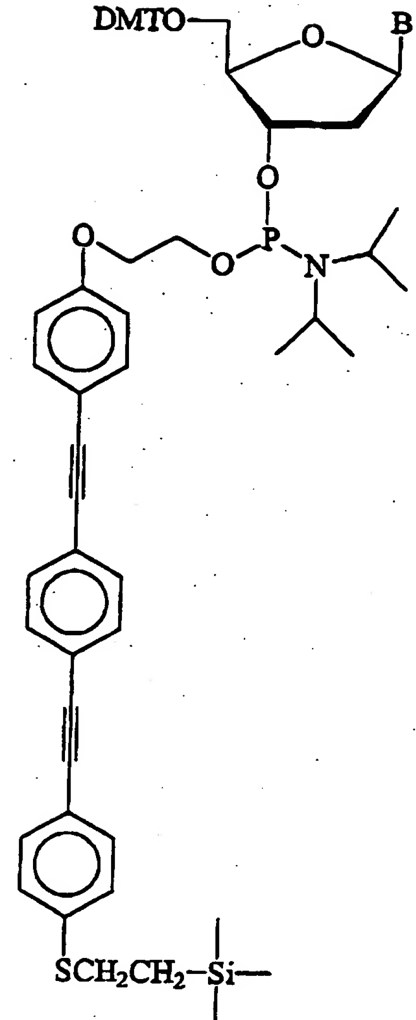
Scheme 1

FIG. 7



5'-Attachment

8A



Any Position Attachment

8B

FIG. 8

Synthesis Scheme of C109

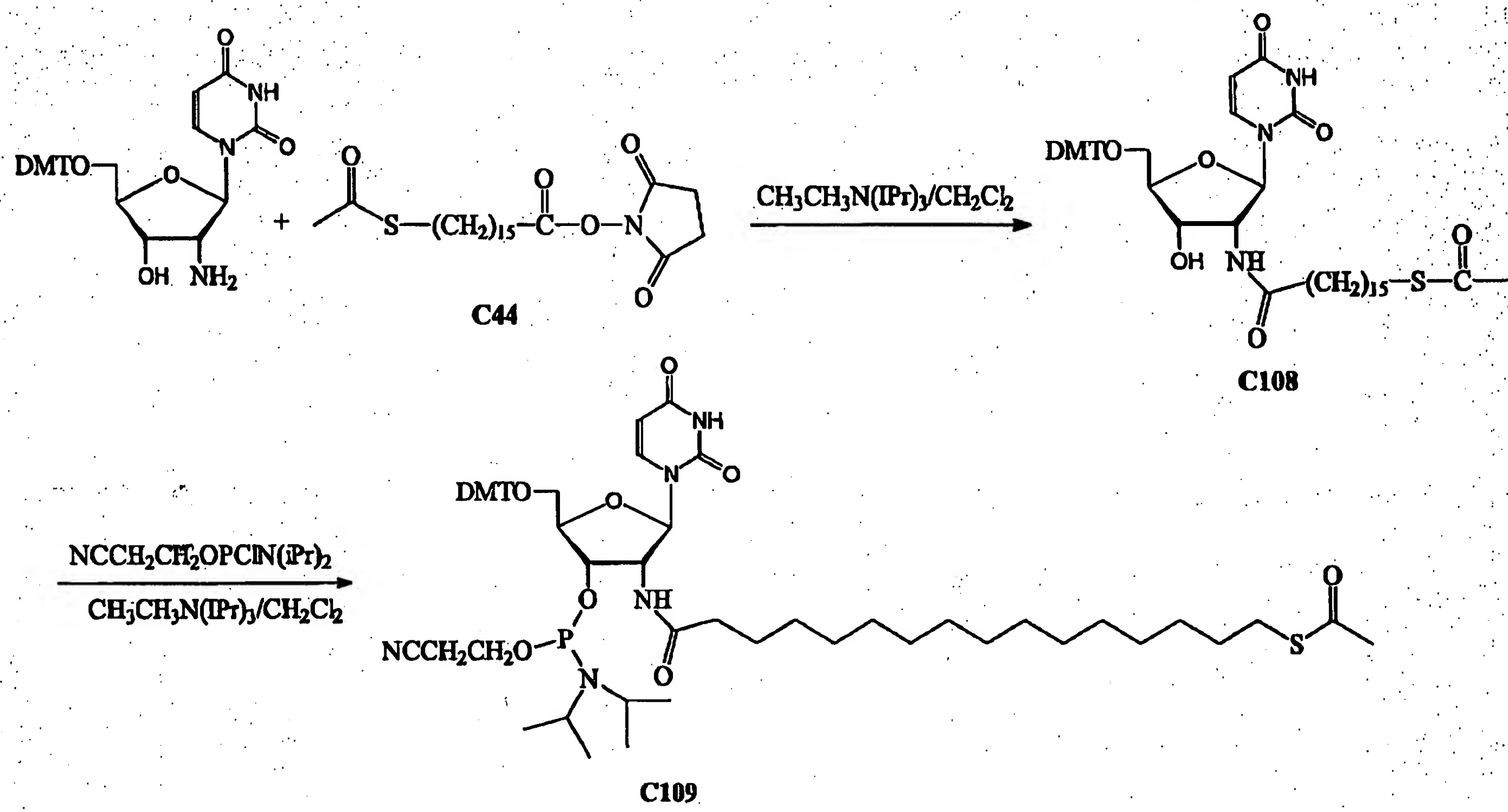


FIG. 9

09135193 .081798

Synthesis Scheme f Ethylene Glycol Terminated Wires

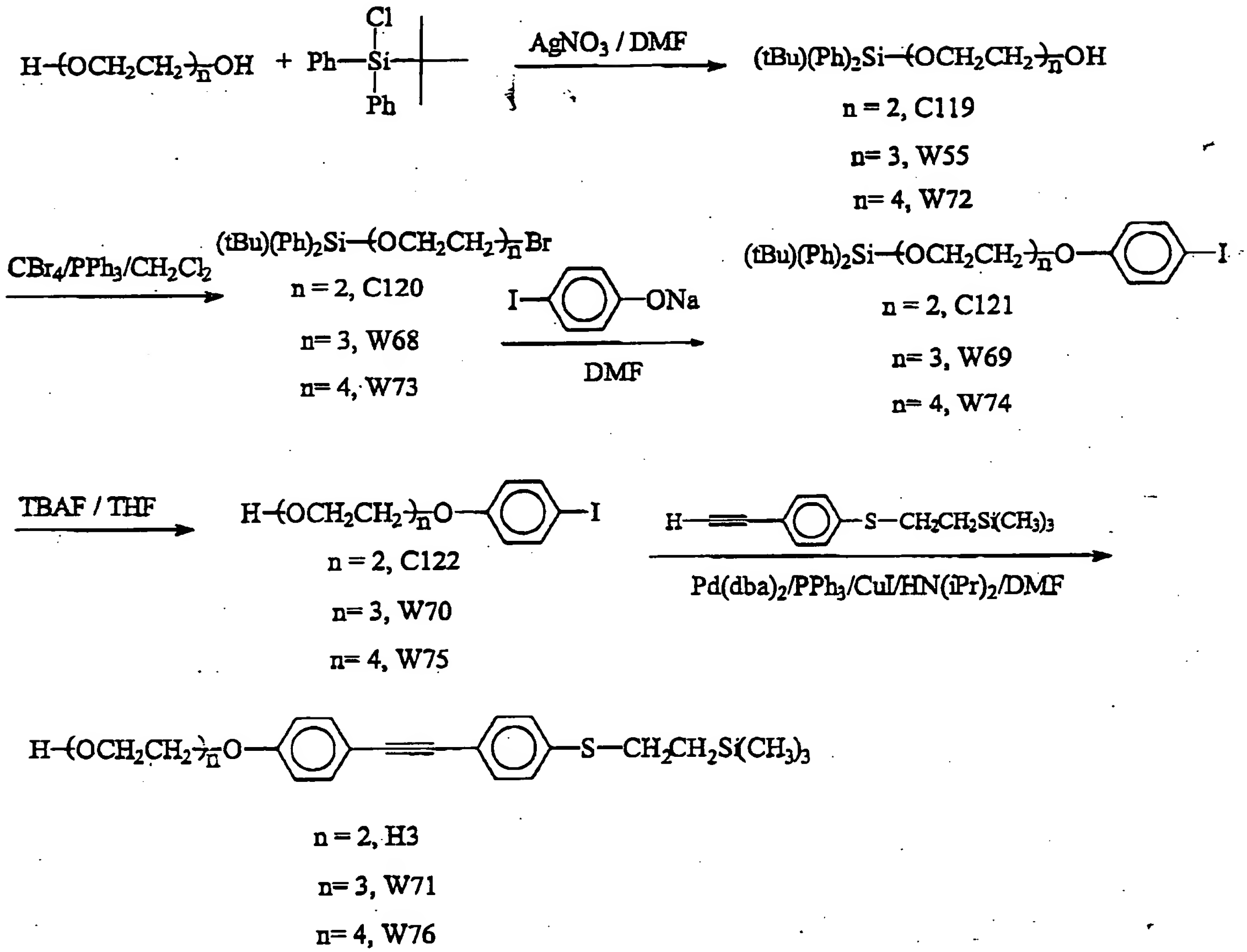


FIG. 10

Synthesis Scheme of Branched Adenosine

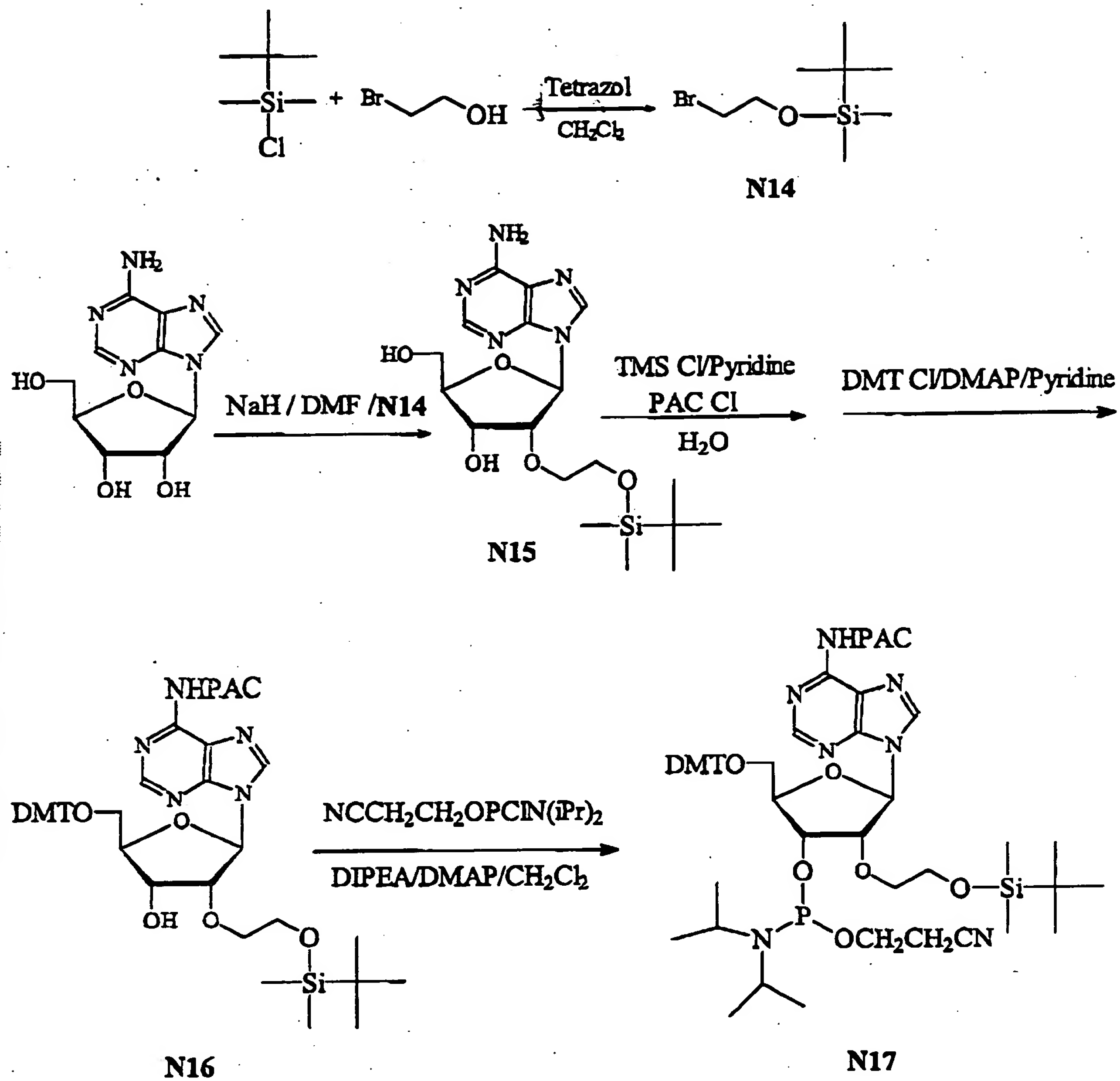
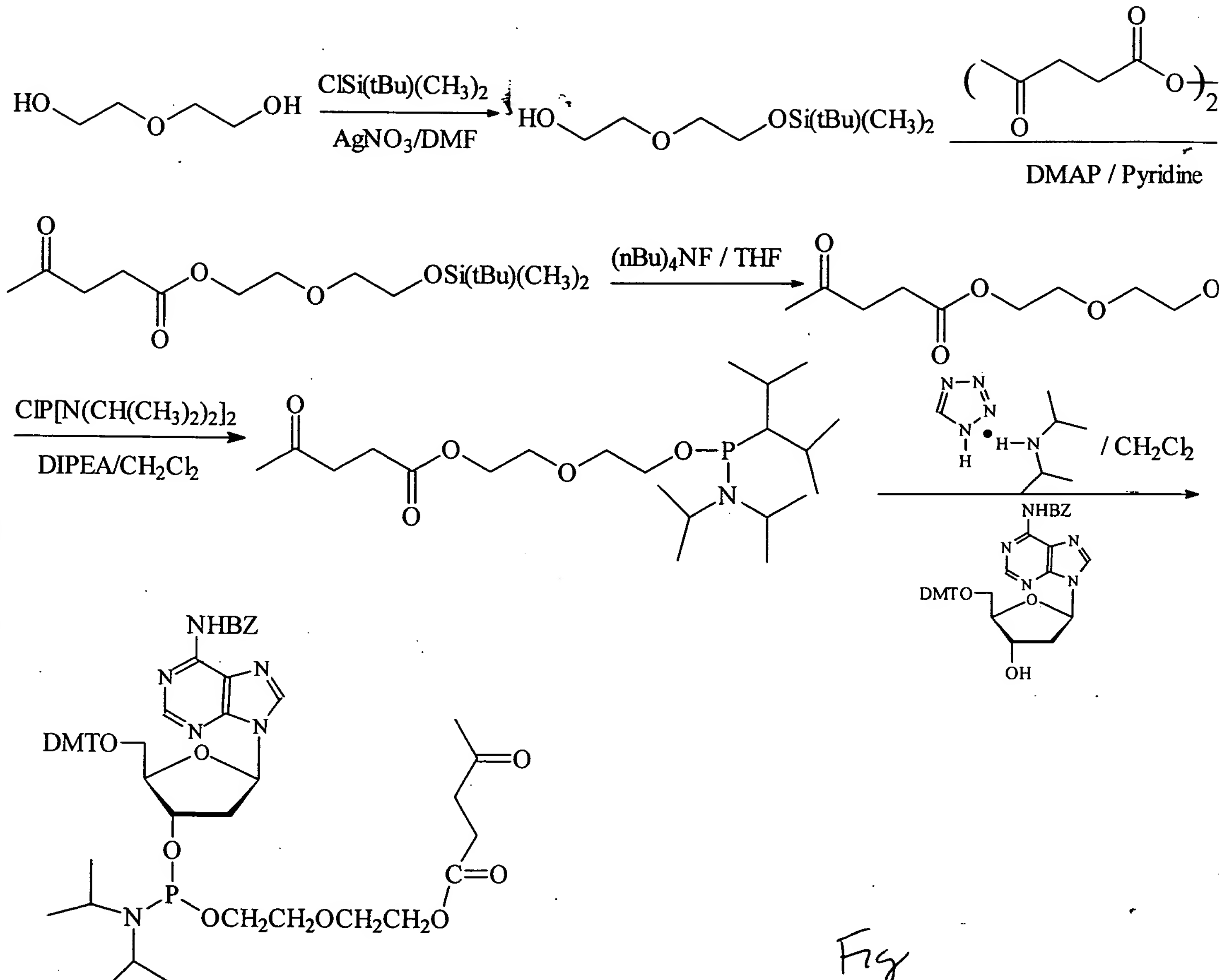


FIG. 11A

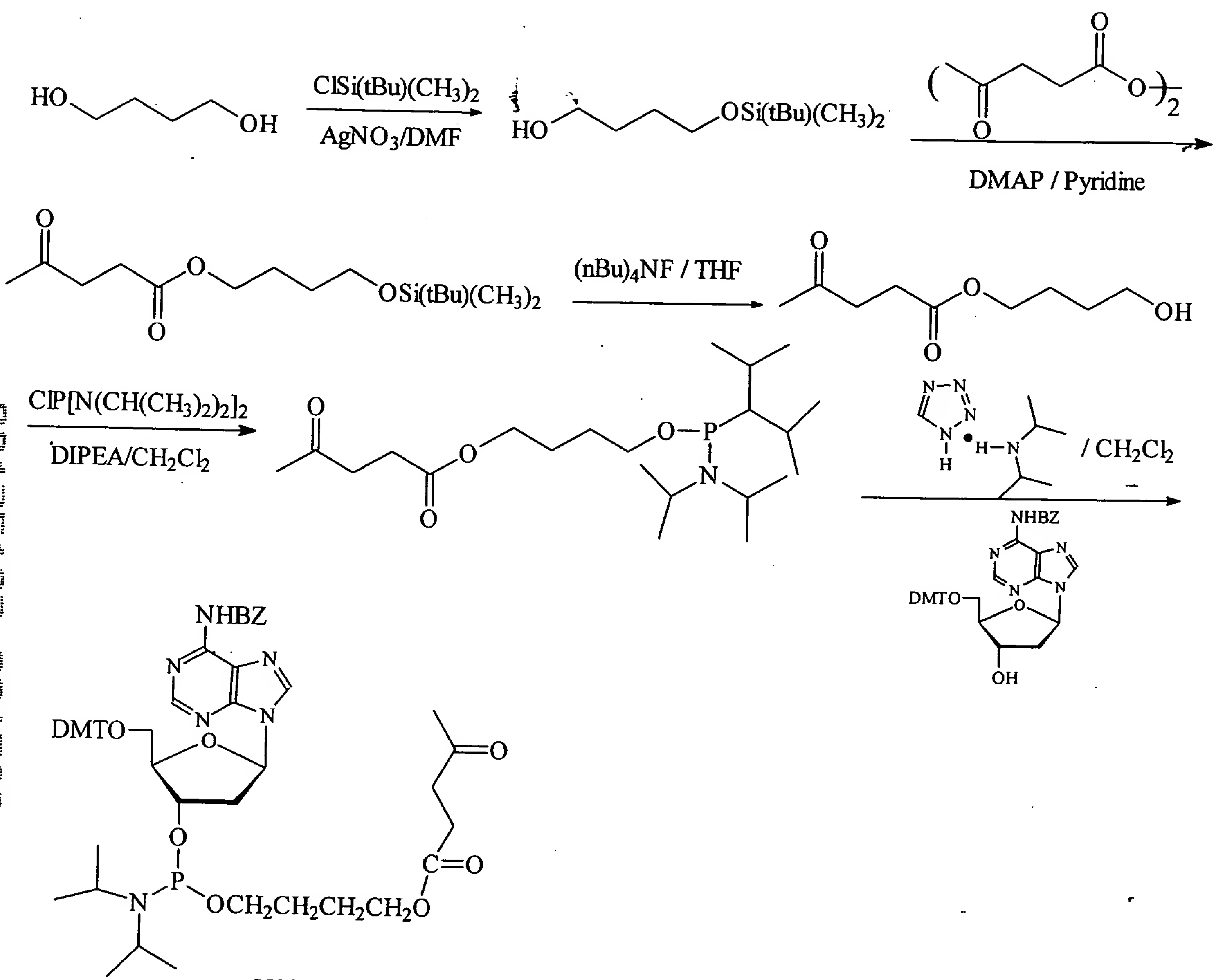
Synthesis Scheme of W90



W90

Fig 11B

Synthesis Scheme of N38



N38

Fig 11C

Procedure of rporating Multiple Metal Comple nto DNA

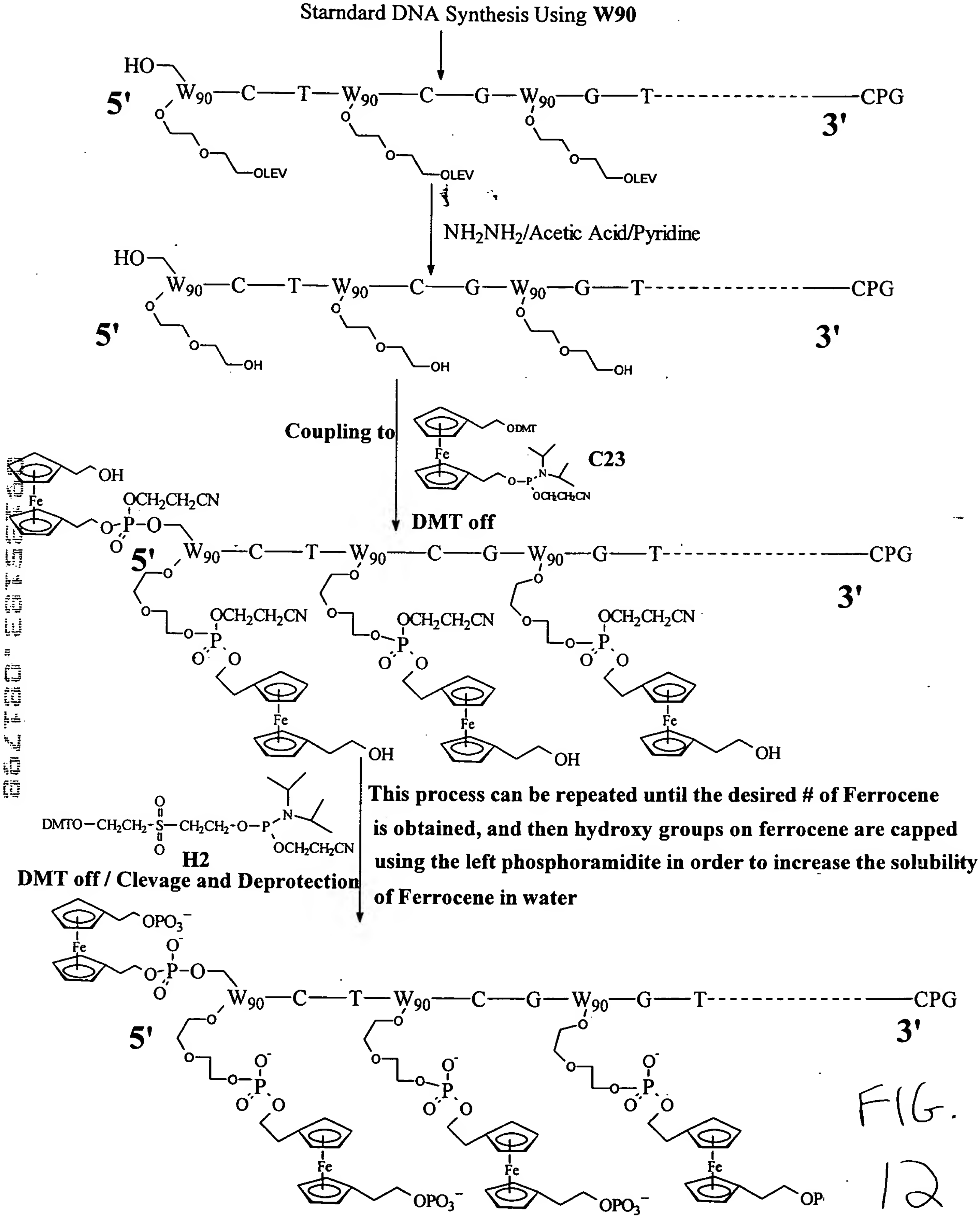


FIG. 12

Scheme f Inc rp rating Multiple ETMs Using Branching Ph sphoramidite

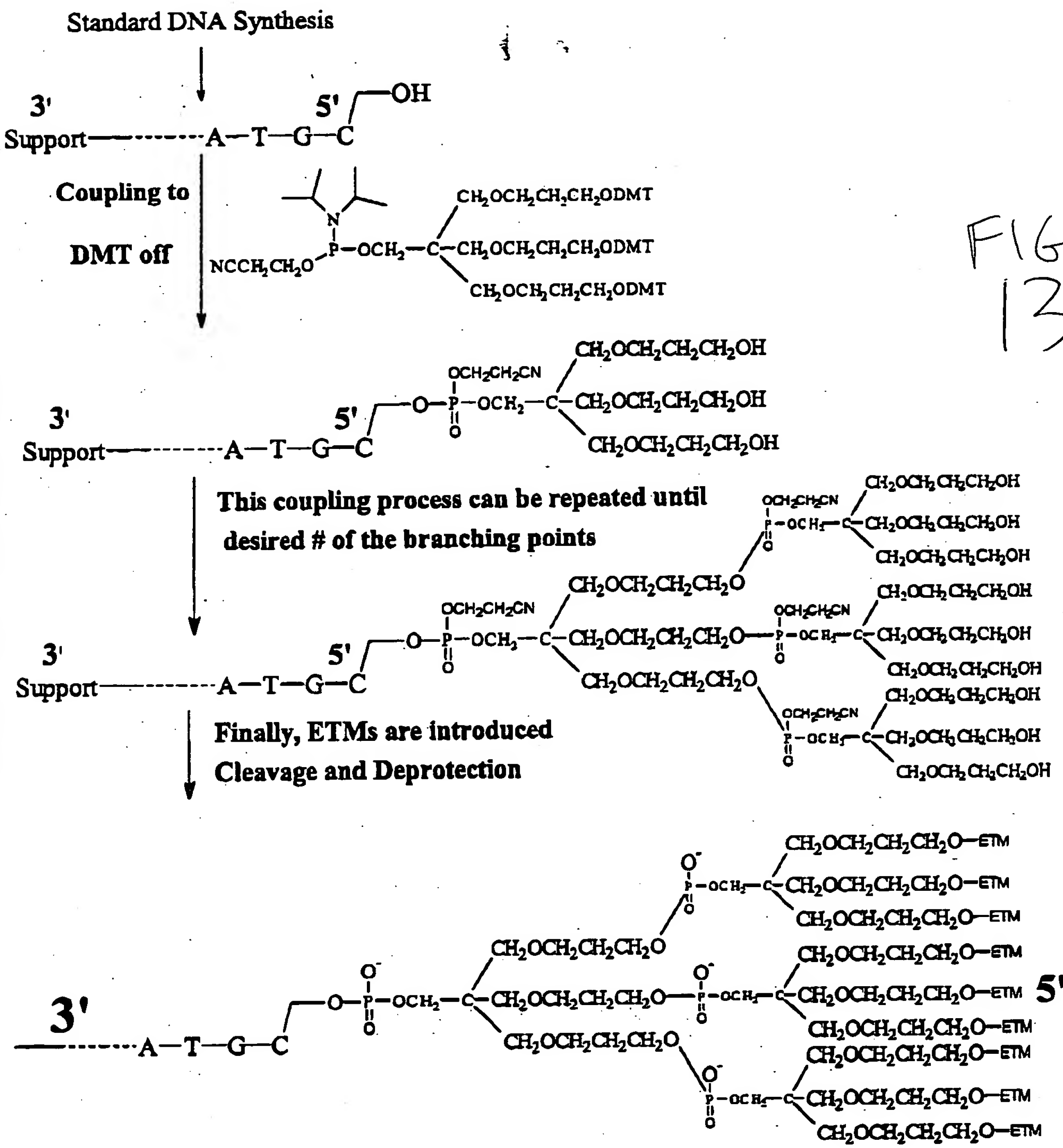


FIG. 13

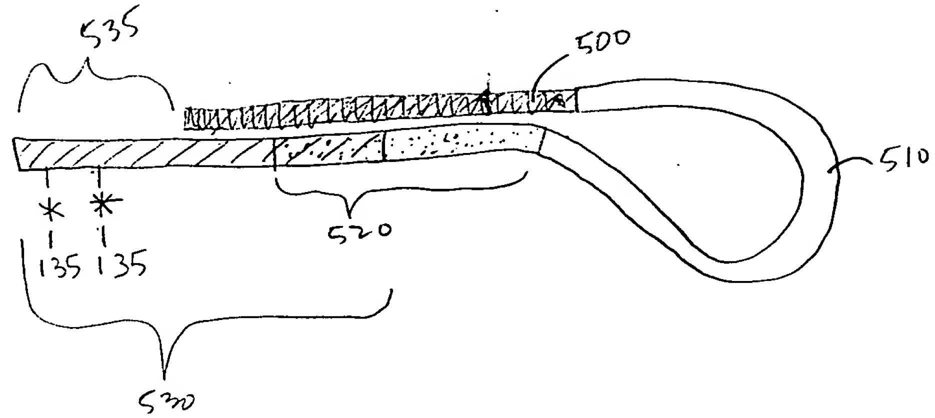


FIG. 14

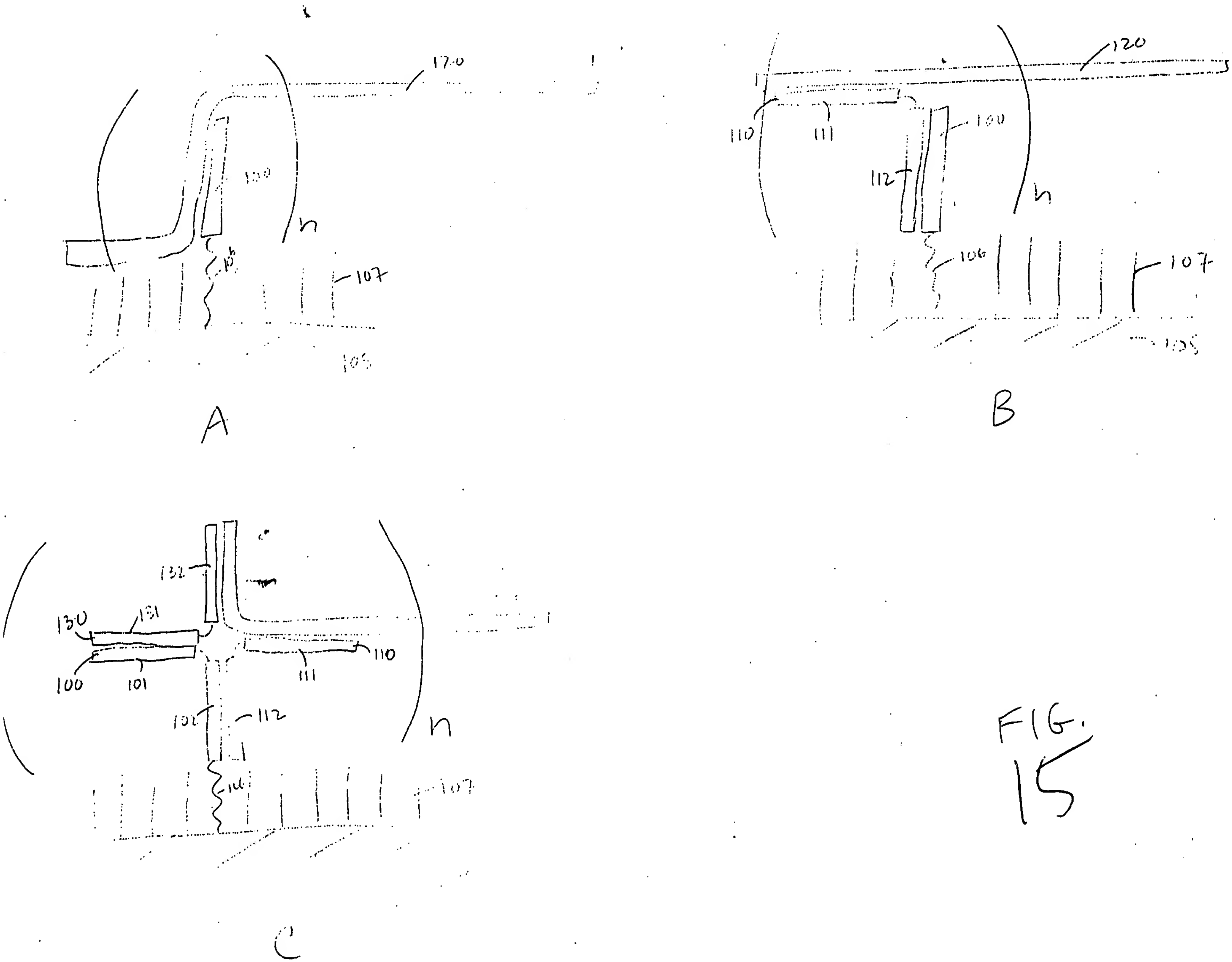


FIG. 15

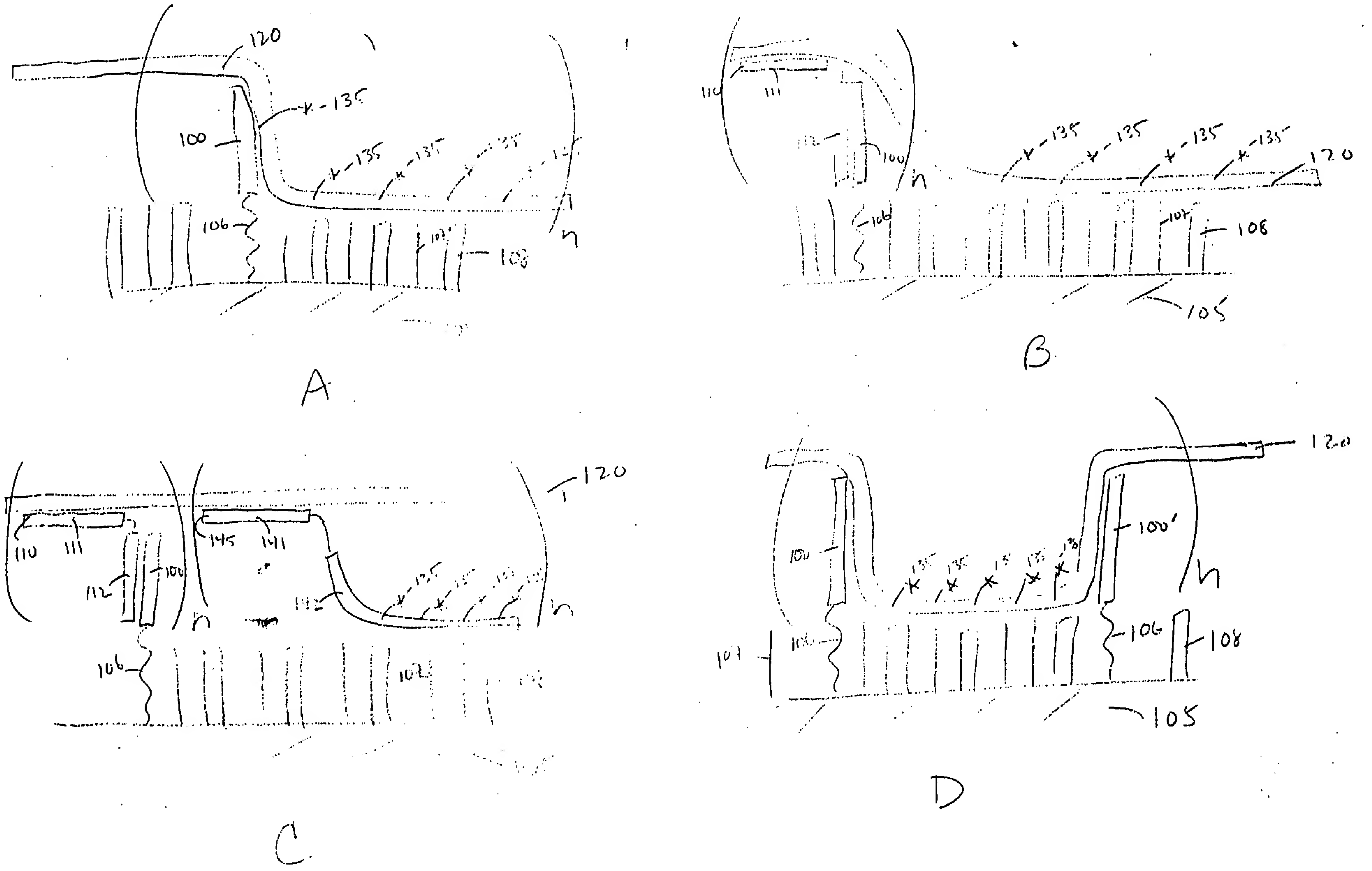

120
135
100
106
108
A
110
111
100
135
120
106
108
105
B
120
110
111
112
100
145
141
106
C
120
100
100'
135
106
108
105
D

FIG 16

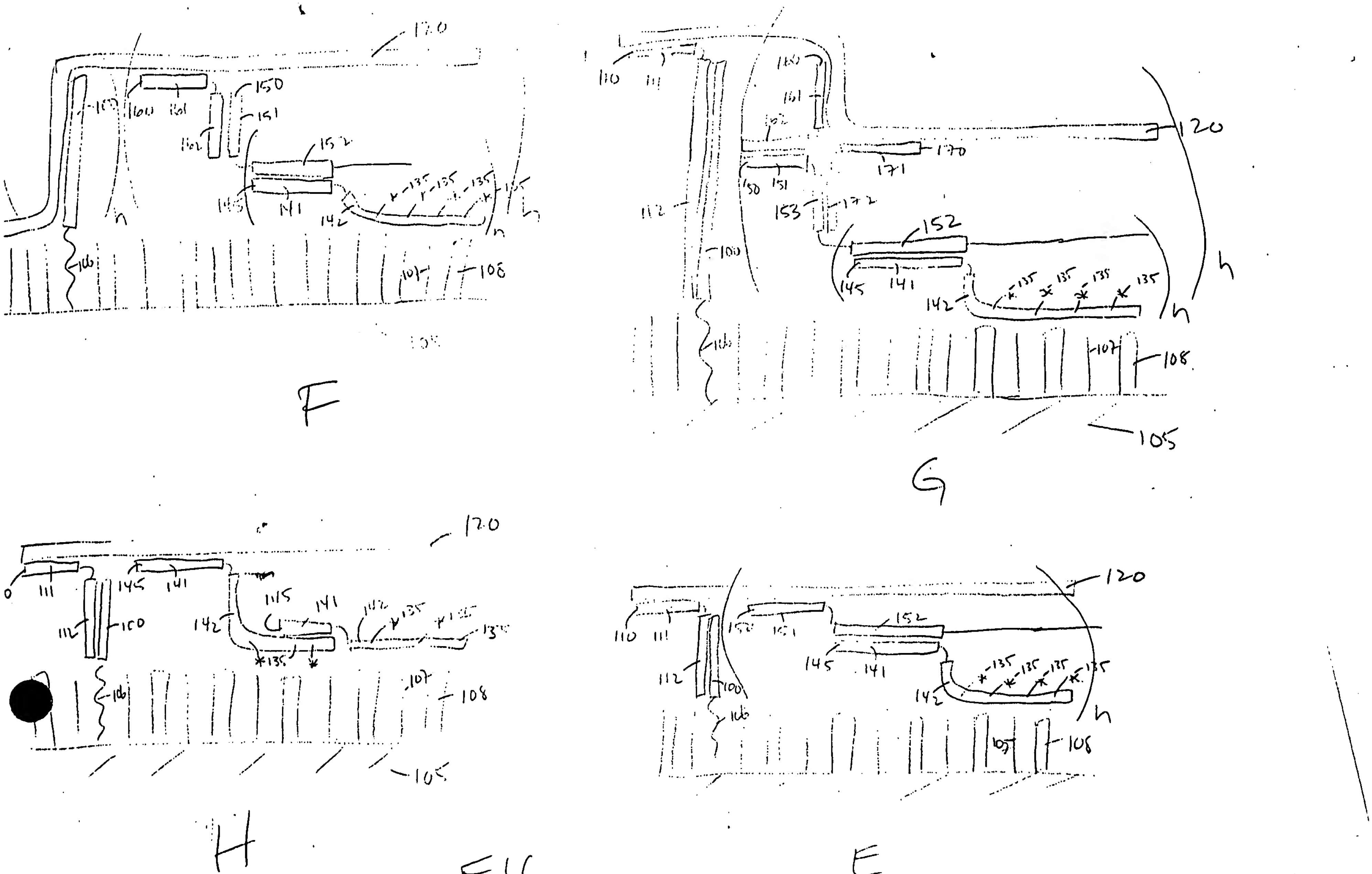

F
G
H
E
100
101
105
106
107
108
110
111
112
115
120
135
141
142
145
150
151
152
153
160
161
162
170
171
172

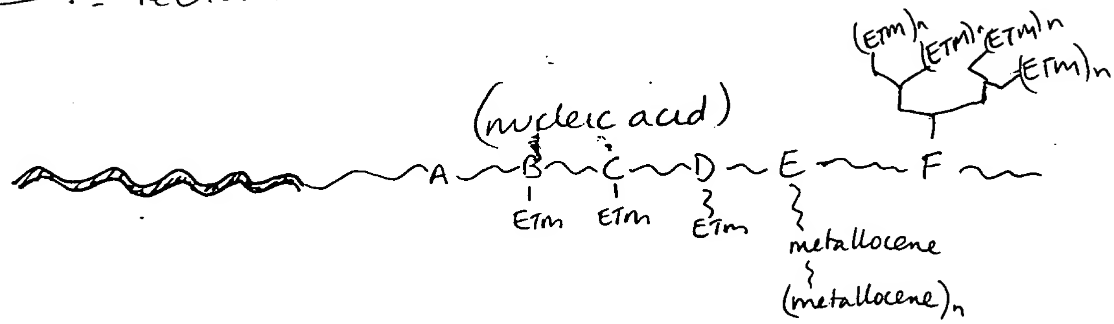
FIG. 16 cont.

label probes

= first hybridizable portion of label probe

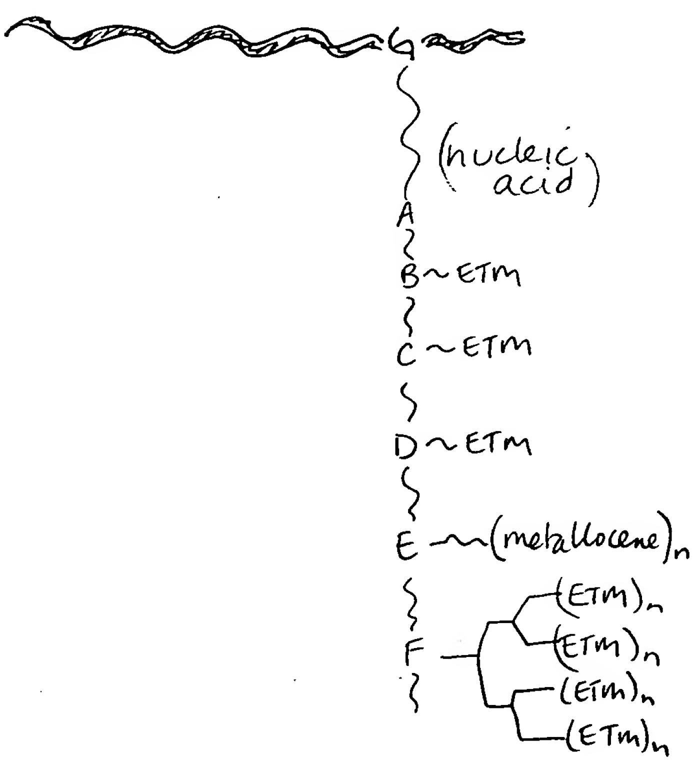
= recruitment linker

A.



A = nucleoside replacement
B = attachment to a base
C = attachment to a ribose
D = attachment to a phosphate
E = metallocene polymer, attached to a ribose, phosphate, or base
F = dendrimer structure, attached via a ribose, phosphate or base

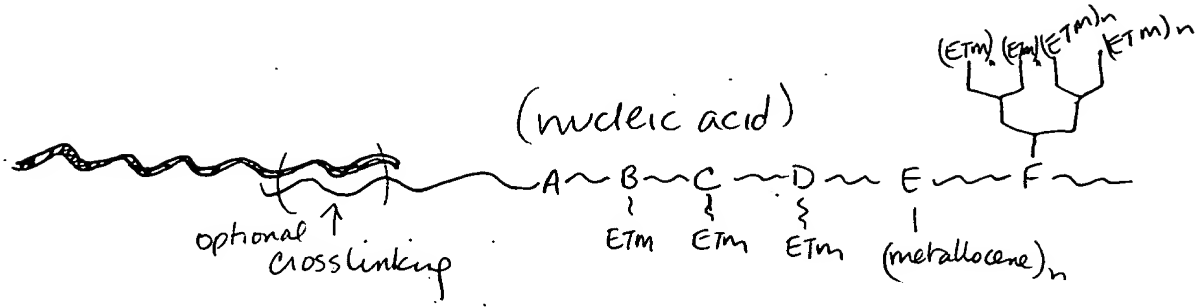
B.



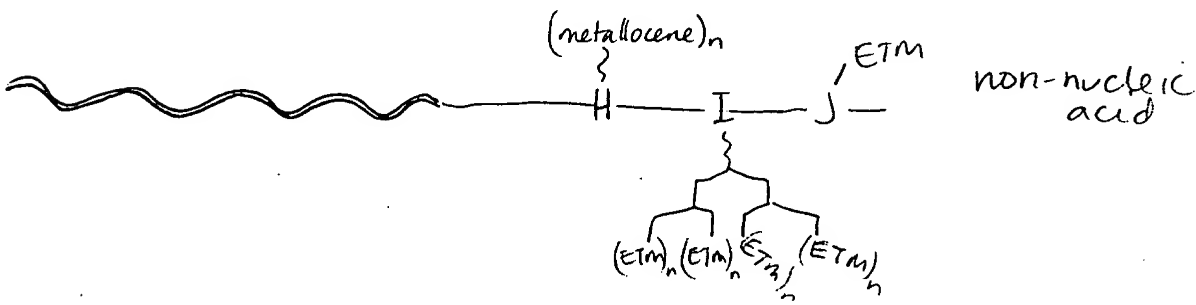
G = attachment via a "branching structure", through ribose, phosphate or base

FIG. 17

C.



D.



H = attachment of metallocene polymers

I = attachment via dendrimer structure

J = attachment using standard linkers

E.

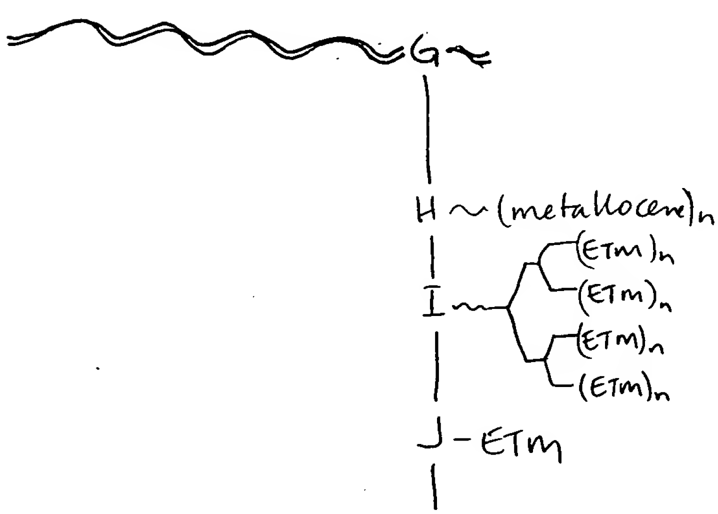


FIG. 17 cont

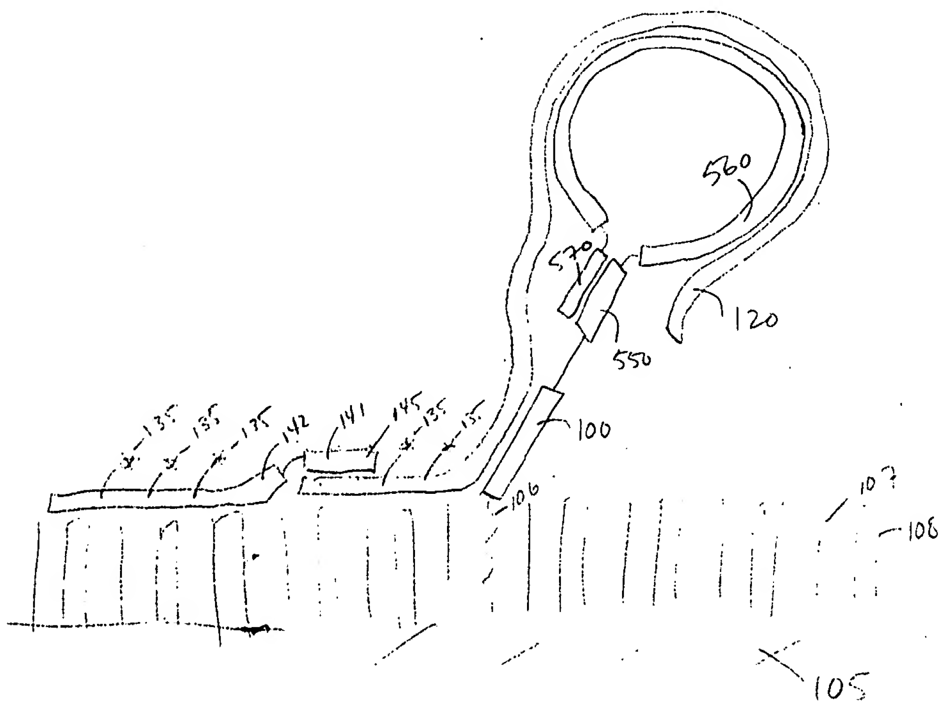

560
570
550
120
100
135
135
135
142
141
145
135
135
106
107
108
105

FIG. 18

D179
5' – A(C15)CCTGGTCTTGACATCCACGGAAGGCGTGGAAATACGTATTCGTGCCTA – 3'

D309 (Dendrimer)
5' – (W38)(Branching)(Branching)CATGGTTAACGTCAATTGCTGCGGTTATTAA – 3'

D295
5' - (N6)G(N6)CT(N6)C(N6)G(N6)C(N6)CCCATGGTTAGACTGAATTGCTGCGGTTATTAA – 3'

D297
5' - (N6)G(N6)CT(N6)C(N6)G(N6)C(N6)TATGCTCTTGATGGTGCTGTGGAAATCTACTGG – 3'

D298
5' – (N6)G(N6)CT(N6)C(N6)G(N6)C(N6)ATGGTGCTGTGGAAATCTACTGG – 3'

D296
5' - (N6)G(N6)CT(N6)C(N6)G(N6)C(N6)TGACTGAATTGCTGCGGTTATTAA – 3'

D112
5' – CTTCCGTGGATGTCAAGACCAGGAU – 4 unit wire (C11) – 3'

D94
5' – ACCATGGACACAGAU – 4 unit wire (C11) – 3'

D109
5' – CTGCGGTTATTAACU – 4 unit wire (C11) – 3'

2Tar
5' – TAG GCA CGA ATA CGT ATT TCC ACG ATA AAT ATA ATT AAT AAC CGC AGC AAT TGA CGT ATA AAG CTA TCC CAG TAG ATT TCC ACA GC – 3'

D349
5' – A(C15)C (C15)GT GTC CAT GGT AGT AGC TTA TCG TGG AAA TAC GTA TTC GTG CCT A – 3'

D382
5' – (Y63)G(Y63) CT(Y63) C(Y63)G (Y63)C(Y63) CCC ATG GTT AGA CTG AAT TGC TGC GGT TAT TAA – 3'

D383
5' – (Y63)G(Y63) CT(Y63) C(Y63)G (Y63)C(Y63) CCC ATG GTT AGA CTG GCT GTG GAA ATC TAC TGG –3'

D468
5' – (N6)G(N6) CT(N6) C(N6)G (N6)C(N6) (glen)(glen)(glen) CTT TAC TCC CTT CCT CCC CGC TGA AAG TAC – 3'

D449
5' – CGG AGT TAG CCG GTG CTT CTT CTG CGG G(C131)(C131) (C131)(C131)(N6) G(N6)C T(N6)C (N6)G(N6) C(N6)T – 3'

D417
5' – CTT TAC TCC CTT CCT CCC CGC TGA AAG TAC TTT ACA ACC C – 3'

FIG. 19

EU1
5' – ATC CTG GTC TTG ACA TCC ACG GAA GAT GTC CCT ACA GTC TCC ATC AGG CAG TTT CCC AGA CA - 3'

MT1
5' – TCT ACA TGC CGT ACA TAC GGA ACG TAC GGA GCA TCC TGG TCT TGA CAT CCA CGG AAG – 3'

D358
5' – (N6)G(N6) CT(N6) C(N6)G (N6)C(N6) CCG TAT GTA CGG CAT GTA GA – 3'

D334
5' – GCT ACT ACC ATG GAC ACA GAU – 4 unit wire (C11) – 3'

D335
5' – ACA GAC ATC AGA GTA ATC (N6)GC C(N6)G TC(N6) TGG (N6)T – 3'

LP280
5' – GAT TAC TCT GAT GTC TGT CCA TCT GTG TCC ATG GTA GTA GC – 3'

LN280
5' – GAT TAC TCT GAT GTC TGT CCT AGT ACG AGT CAG TCT CTC CA – 3'

NC112
5' – TCT ACA TGC CGT ACA TAC GGA ACG TAC GGA GCG ATT CGA CTG ACA GTC GTA ACC TCA – 3'

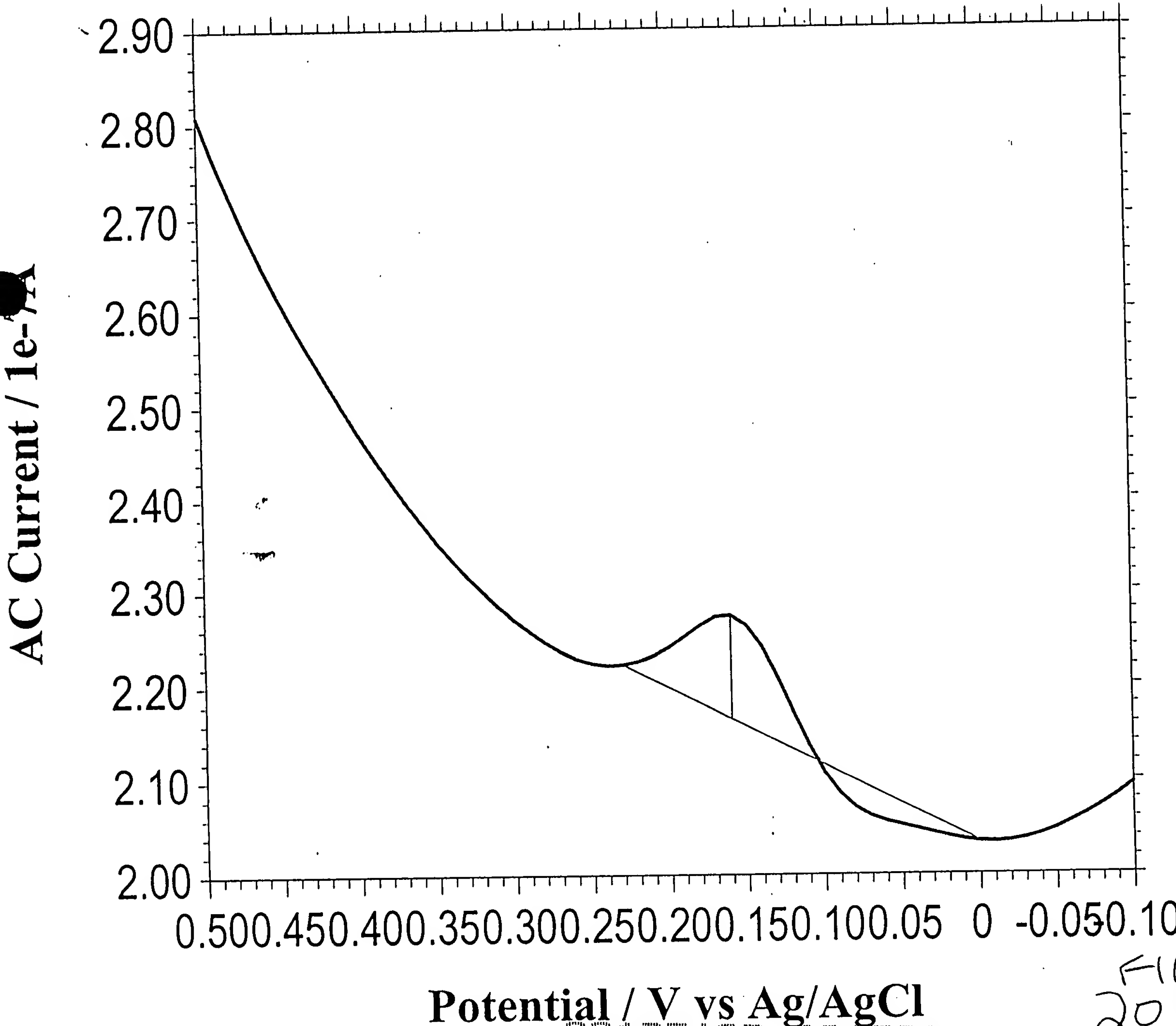
D336
5' – (N6)G(N6) CT(N6) C(N6)G (N6)C(N6) GCG ACA ACT GTA CCA TCT GTG TCC ATG GT – 3'

D405
5' – (C23)(C23)(C23) (C23)(C23)(C23) (C23)(C23)(C23) (C23)AT CTG TGT CCA TGG T – 3'

D429
5' – (N6)G(N6) CT(N6) C(N6)G (N6)C(N6) (C131)AT CTG TGT CCA TGG TAG TAG C – 3'

FIG. 19 cont

Electrode # 55, d179+2tar+309+10%ACN



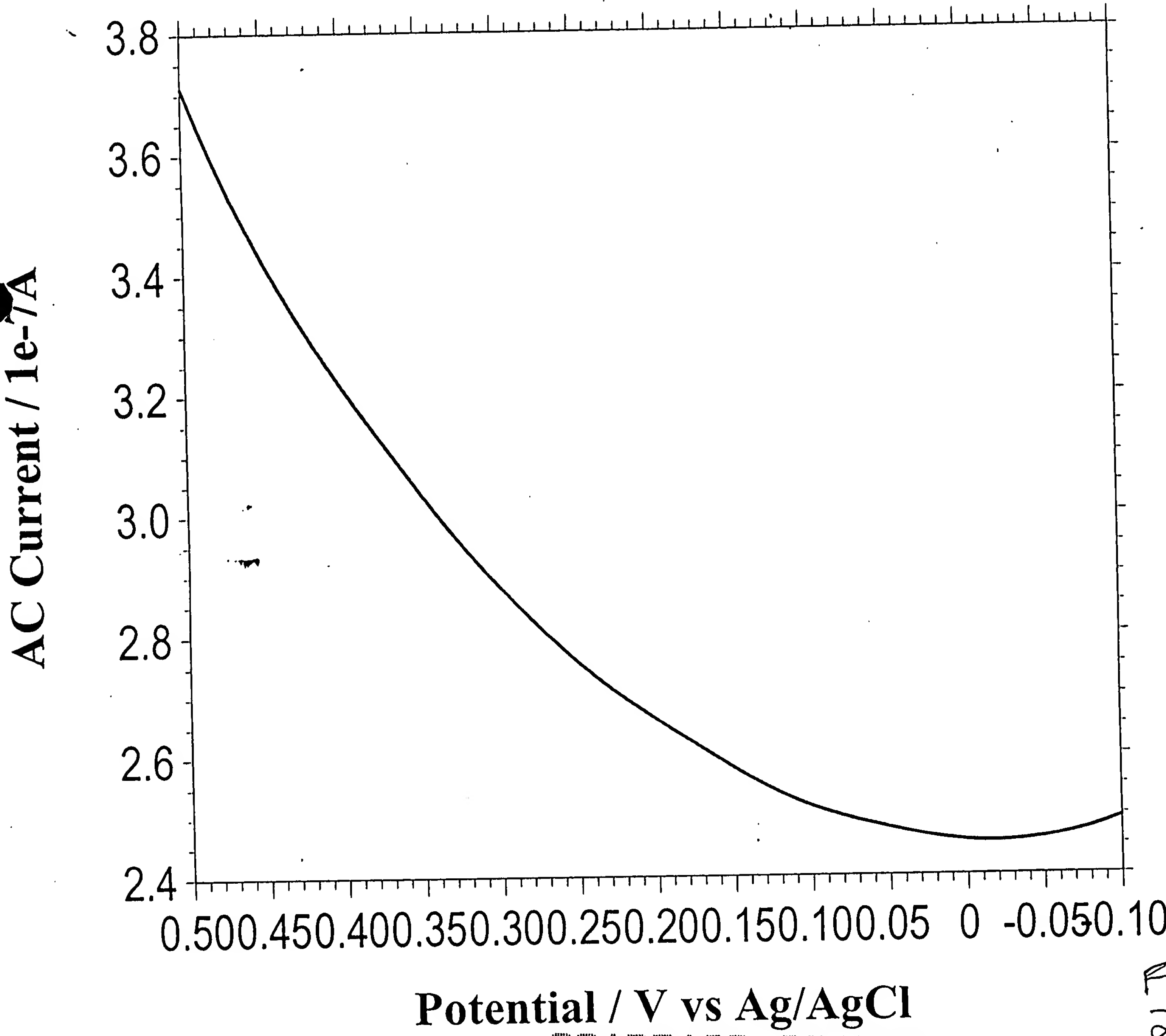
Mar. 19, 1998 17:18:47
Tech: ACV
File: a292_023

Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

Ep = 0.160V
ip = 1.092e-8A
Ap = 7.563e-10VA

FIG. 20A

Electrode # 44, d179+309+10%ACN

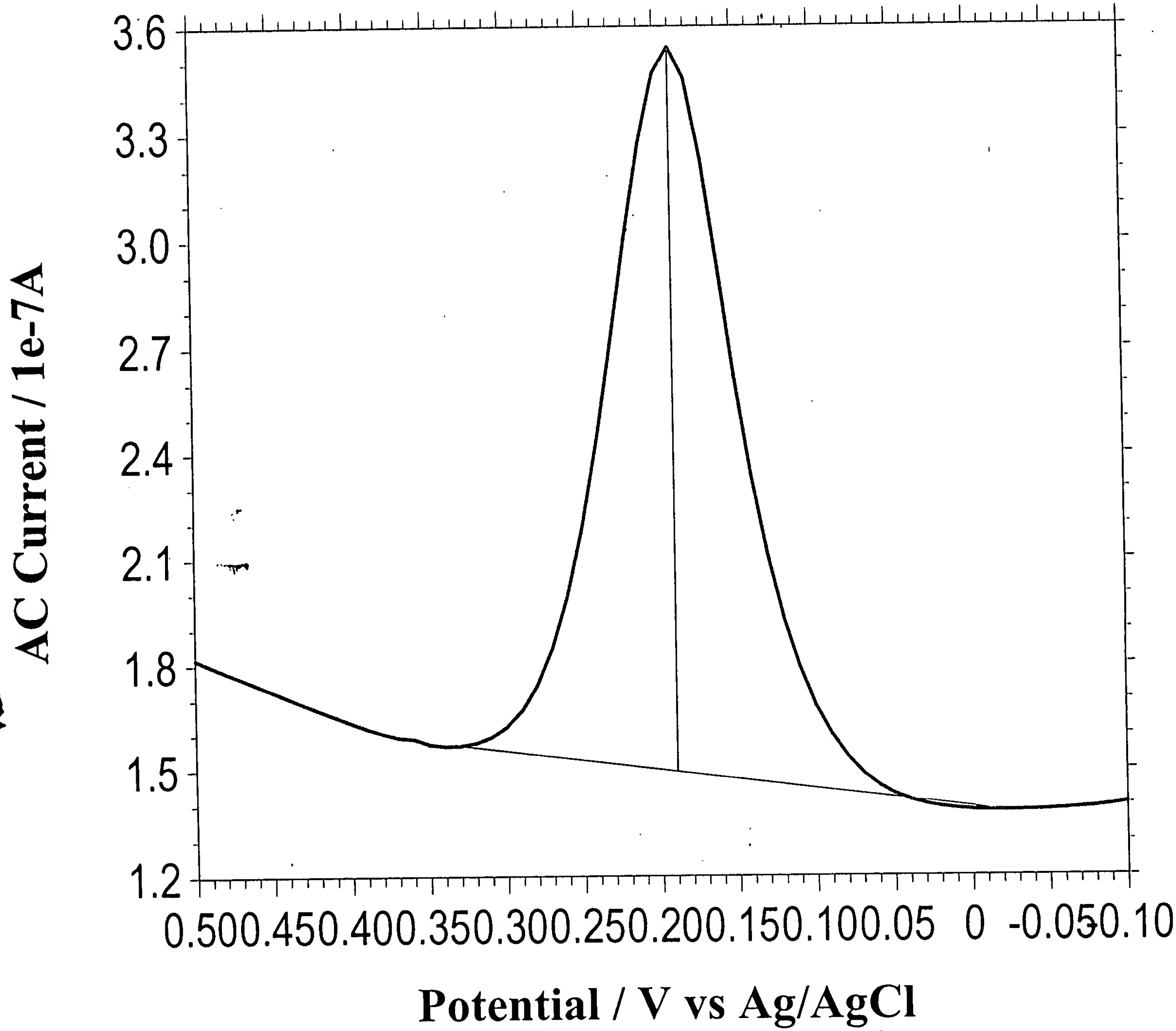


Mar. 19, 1998 17:00:25
Tech: ACV
File: a292_019

Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

FIG. 20B

electrode #25



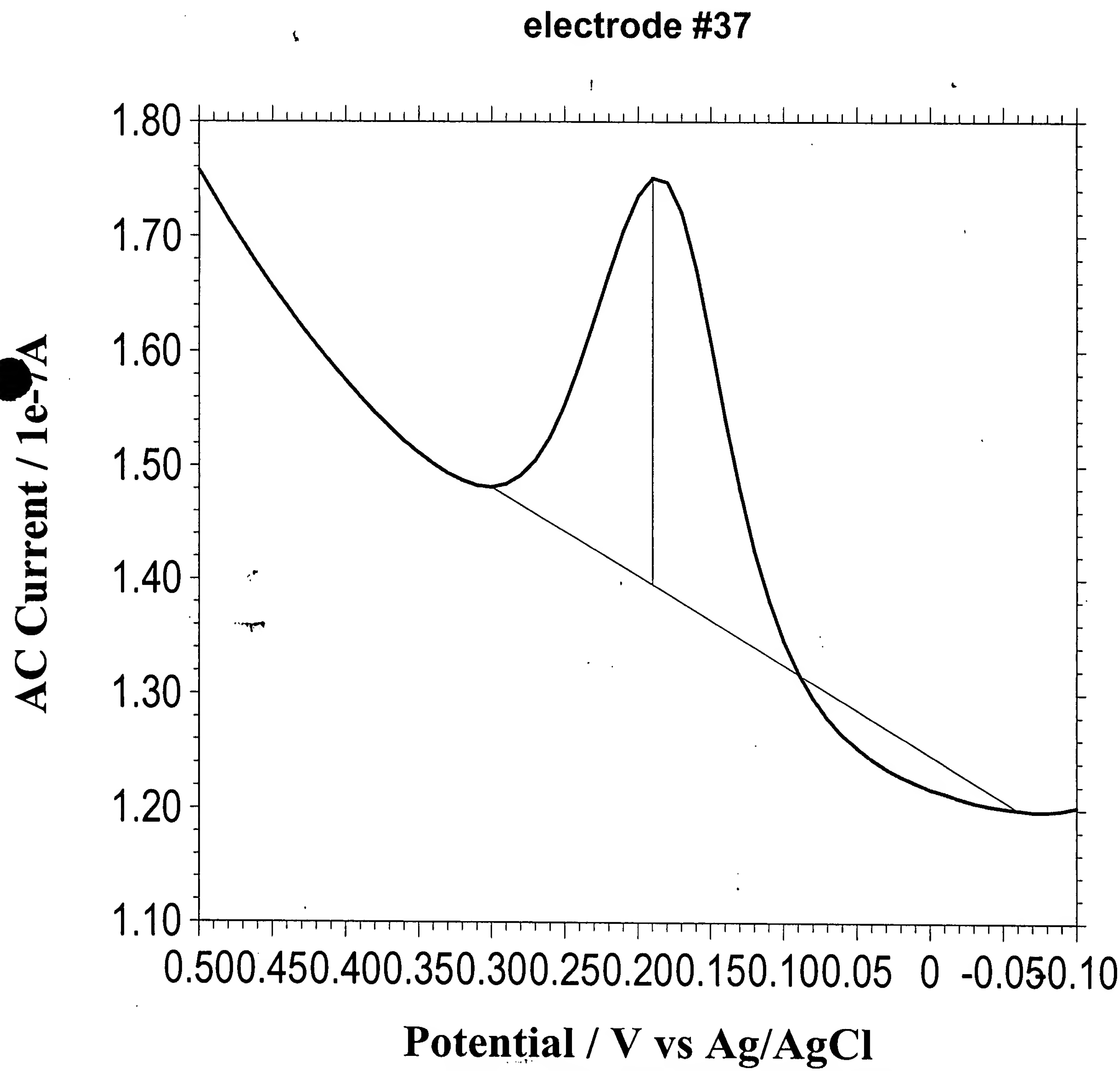
May 14, 1998 16:37:13
Tech: ACV
File: a358_009

Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

Ep = 0.190V
ip = 2.046e-7A
Ap = 2.046e-8VA

FIG. 20 C

09135182 .081798



May 14, 1998 16:58:47
Tech: ACV
File: a358_013

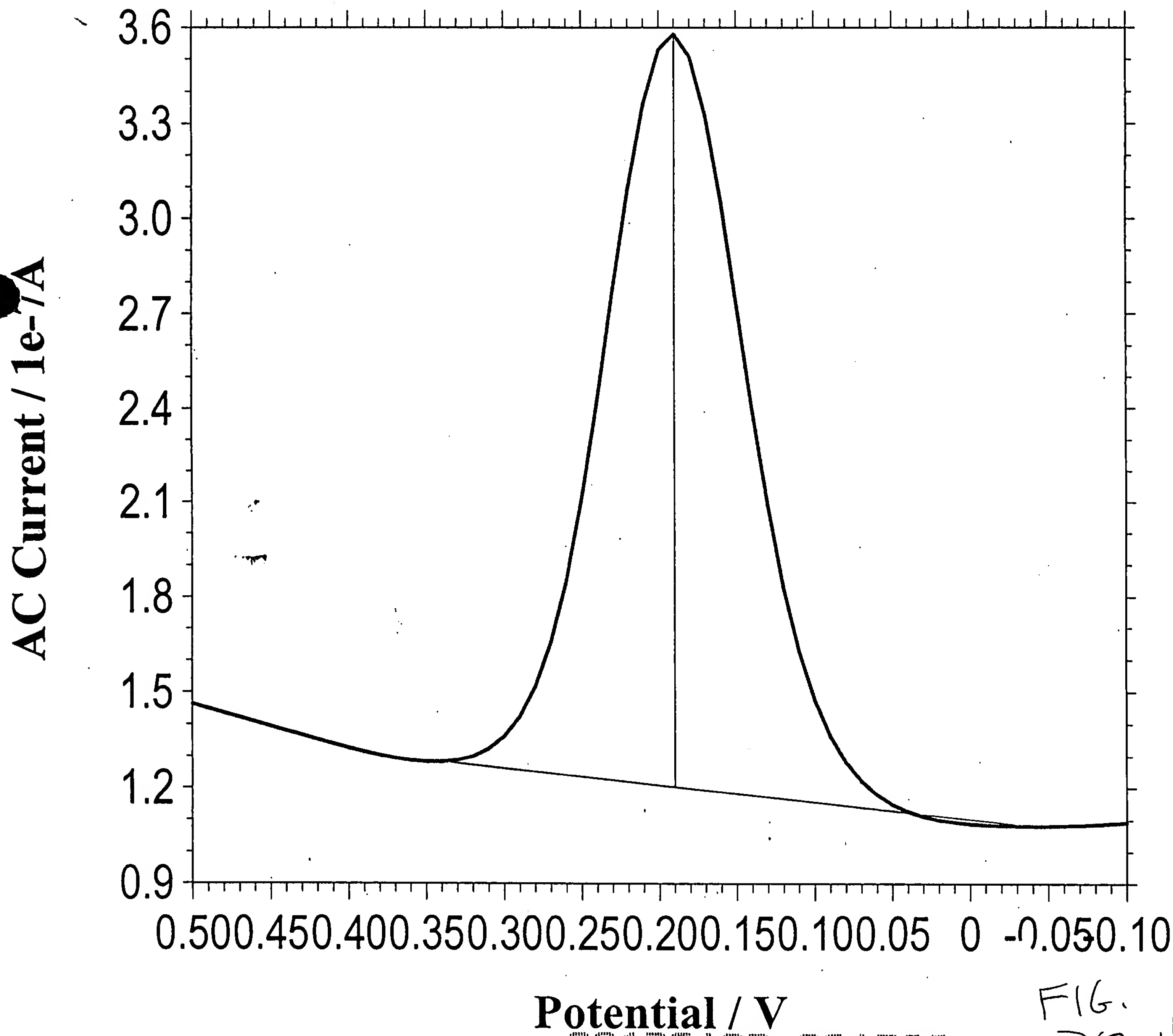
Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

Ep = 0.190V
ip = 3.552e-8A
Ap = 3.568e-9VA

FIG. 20 D

09135183 .081798

Electrode 6



May 14, 1998 15:59:14
Tech: ACV
File: z039_002

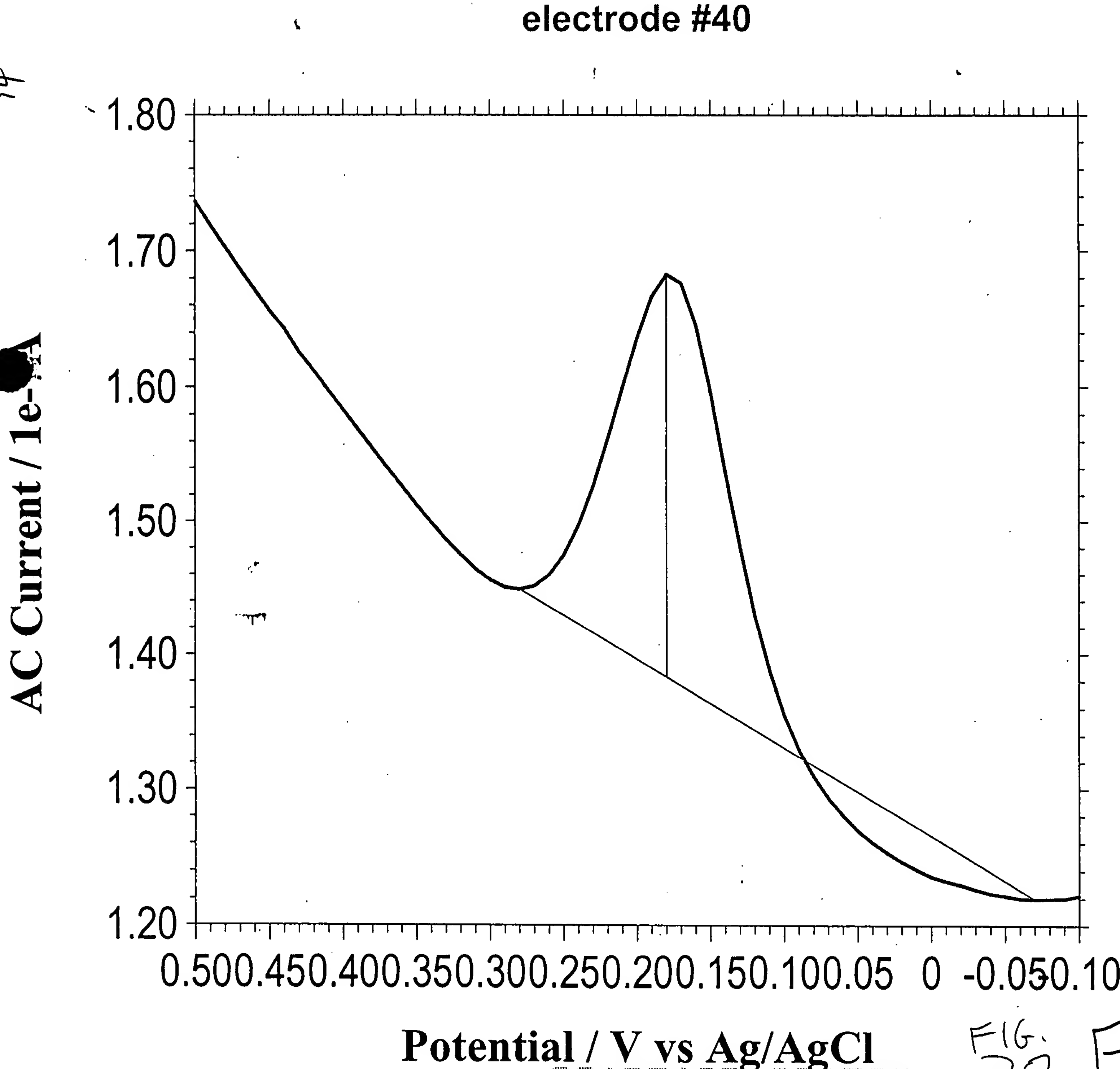
Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

Ep = 0.190V
ip = 2.376e-7A
Ap = 2.594e-8VA

09125183.081798

FIG. 20 E

14



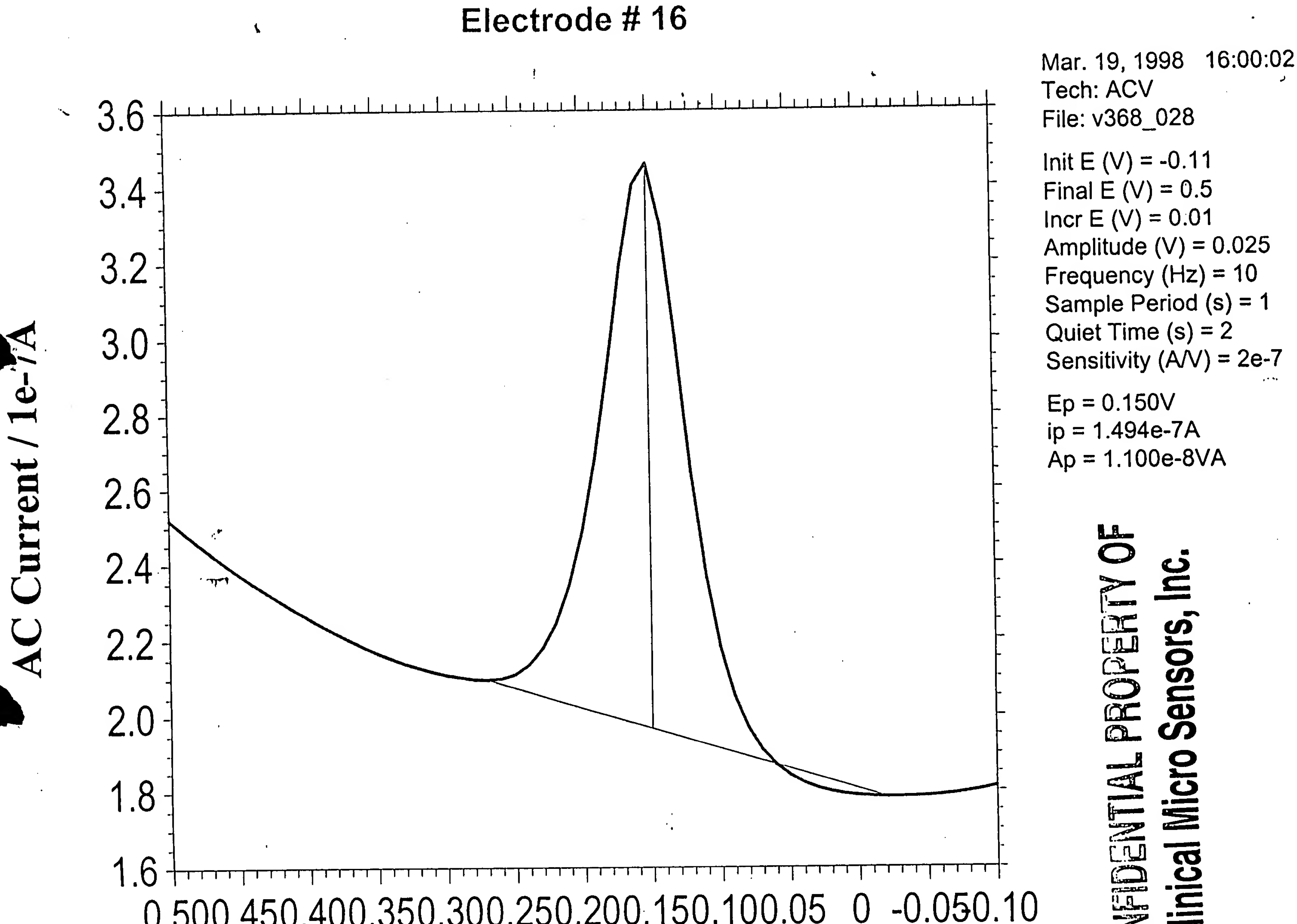
May 14, 1998 17:02:14
Tech: ACV
File: a358_014

Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

Ep = 0.180V
ip = 2.992e-8A
Ap = 2.709e-9VA

FIG. 20 F

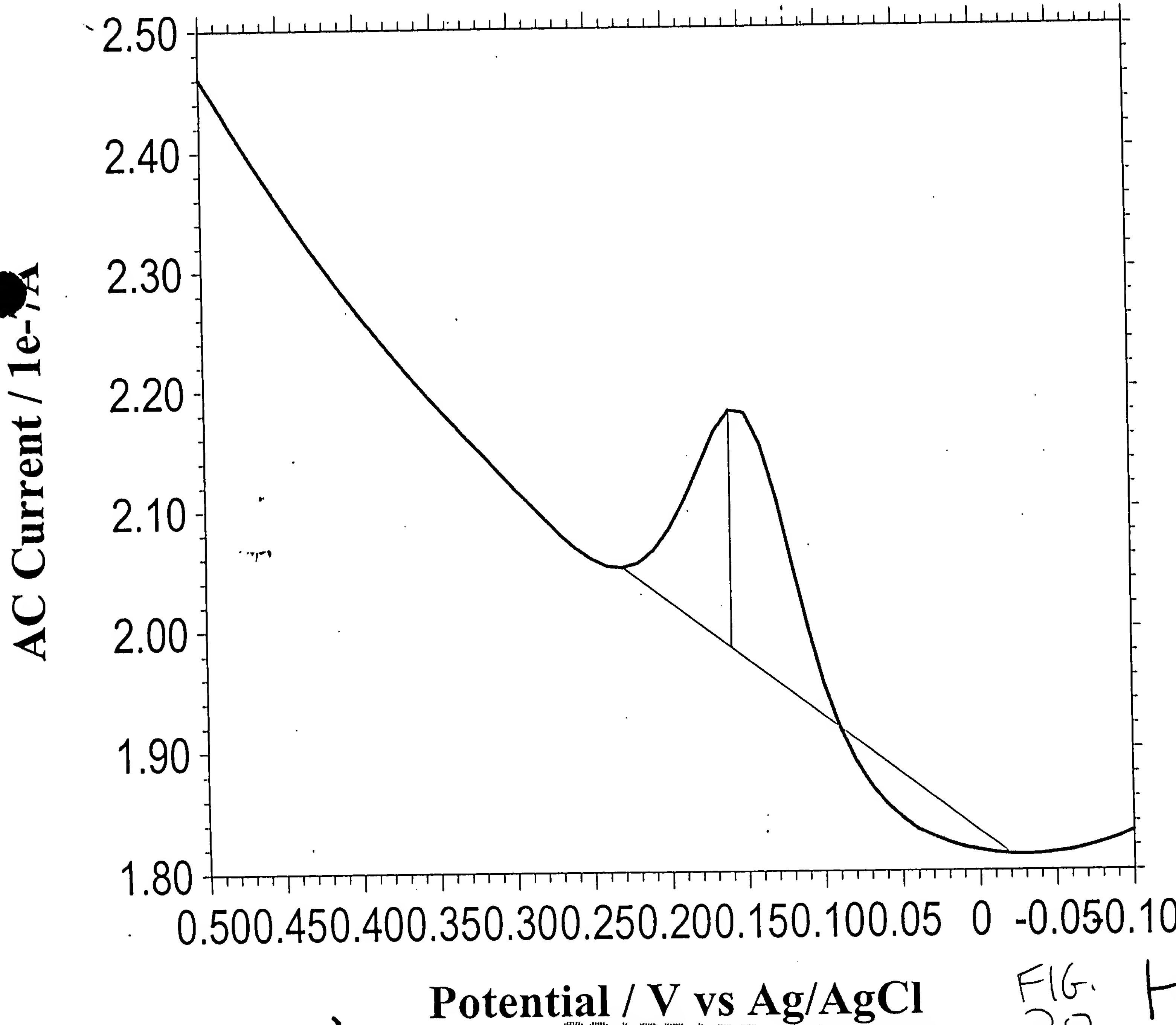
09135183.062799



09135183 .081798

FIG. 20 G

Electrode # 18



Mar. 19, 1998 16:17:15
Tech: ACV
File: v368_032

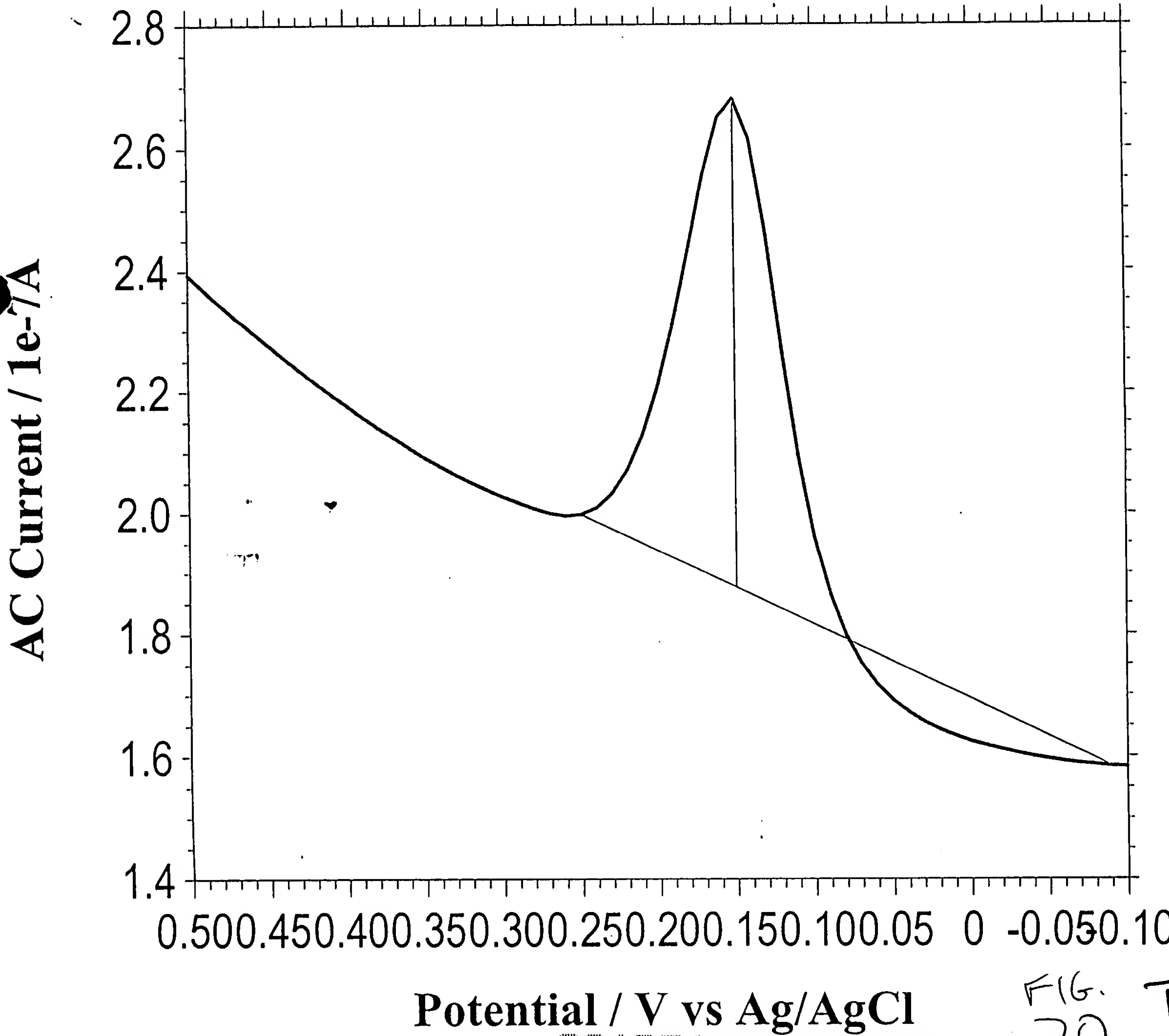
Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

Ep = 0.160V
ip = 1.967e-8A
Ap = 1.443e-9VA

09135183.081798

FIG. 20 H

Electrode # 17



Mar. 19, 1998 16:13:12
Tech: ACV
File: v368_031

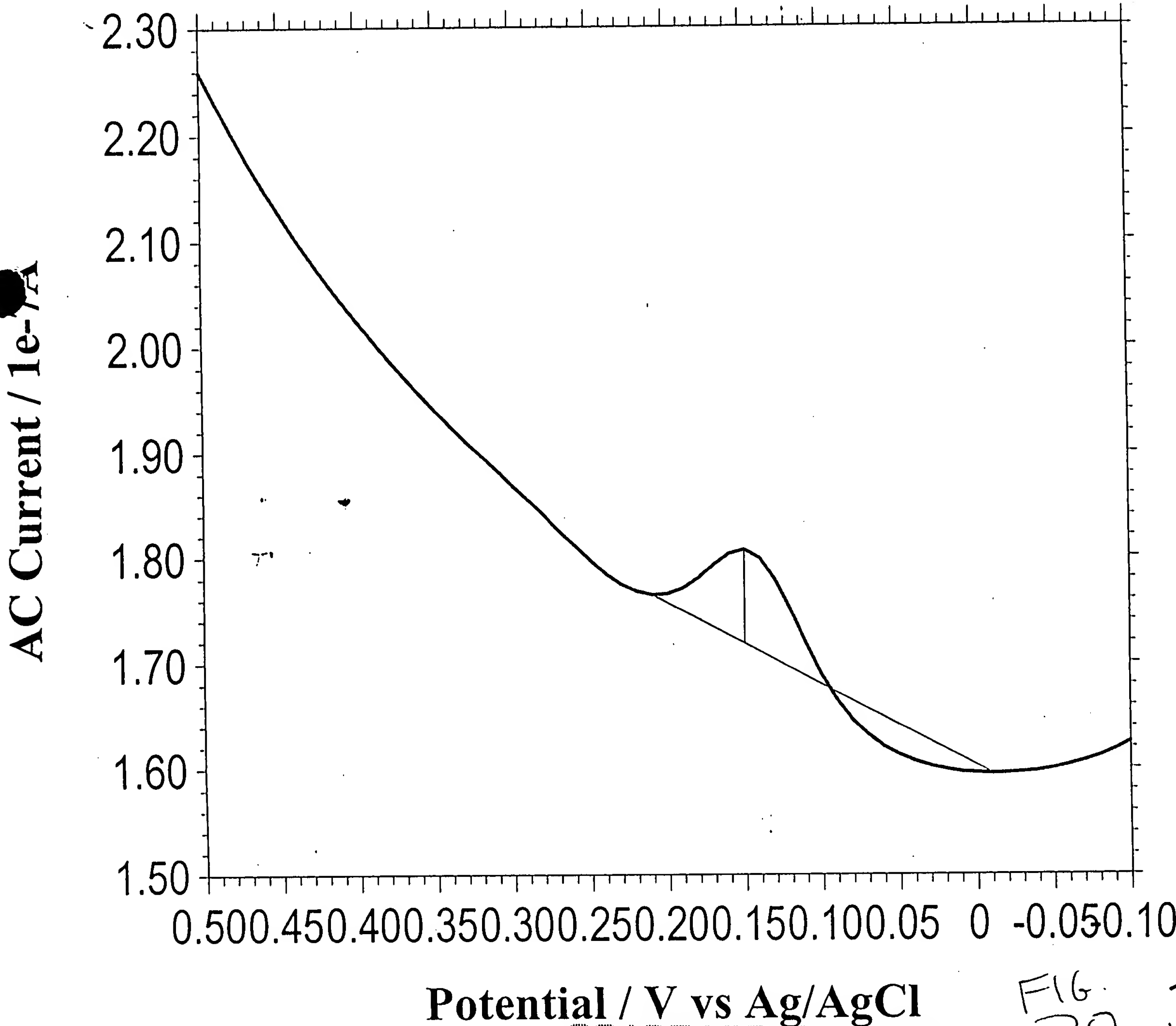
Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

Ep = 0.150V
ip = 8.031e-8A
Ap = 6.033e-9VA

09135182.091798

FIG. 20 I

Electrode # 13

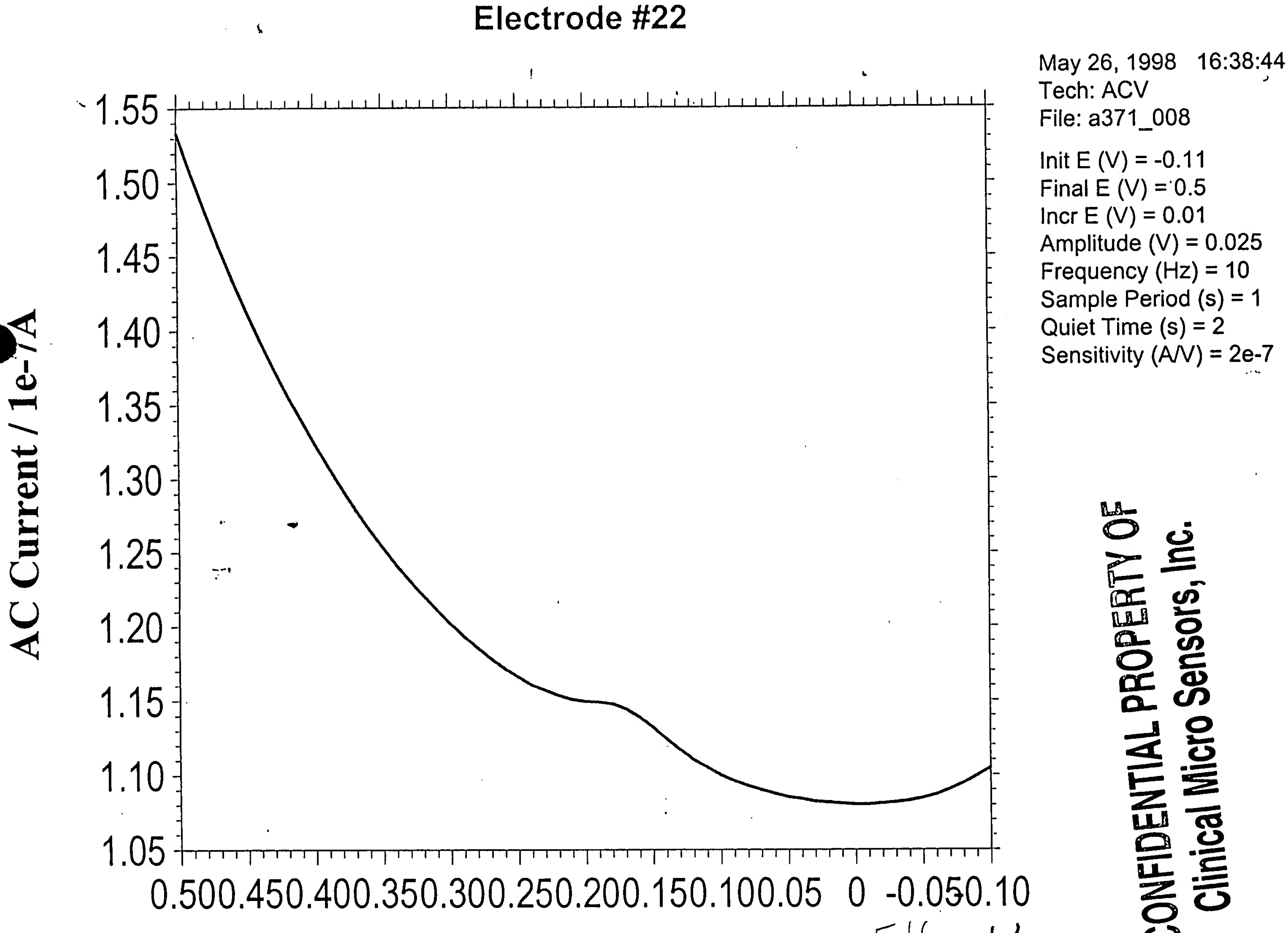


Mar. 19, 1998 15:30:16
Tech: ACV
File: v368_019

Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

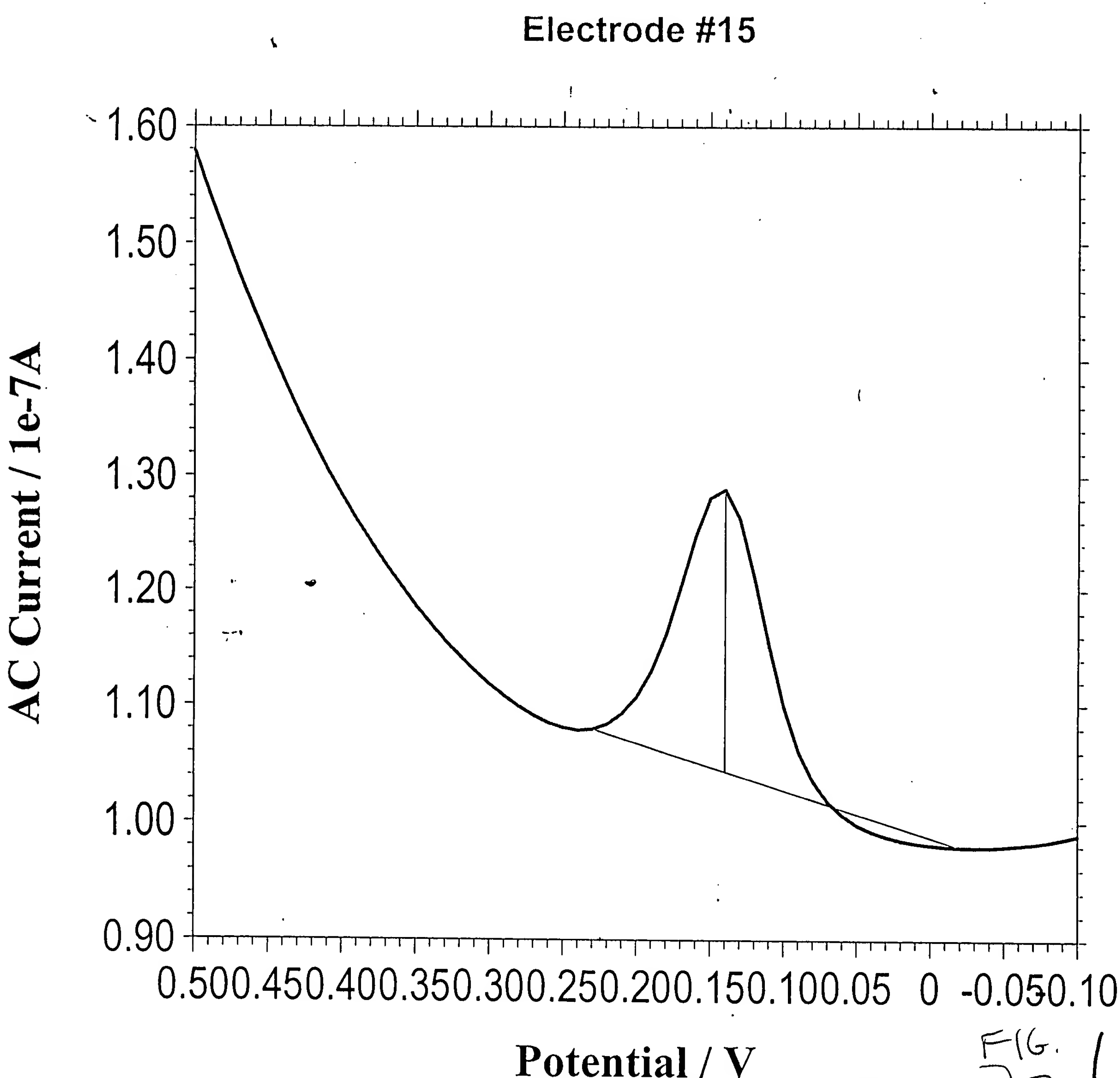
Ep = 0.150V
ip = 8.871e-9A
Ap = 5.512e-10VA

FIG. 20 J



Electrode #22
May 26, 1998 16:38:44
Tech: ACV
File: a371_008
Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7
AC Current / 1e-7A
1.55
1.50
1.45
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
0.50 0.45 0.40 0.35 0.30 0.25 0.20 0.15 0.10 0.05 0 -0.05 -0.10
Potential / V vs Ag/AgCl

FIG. 20K



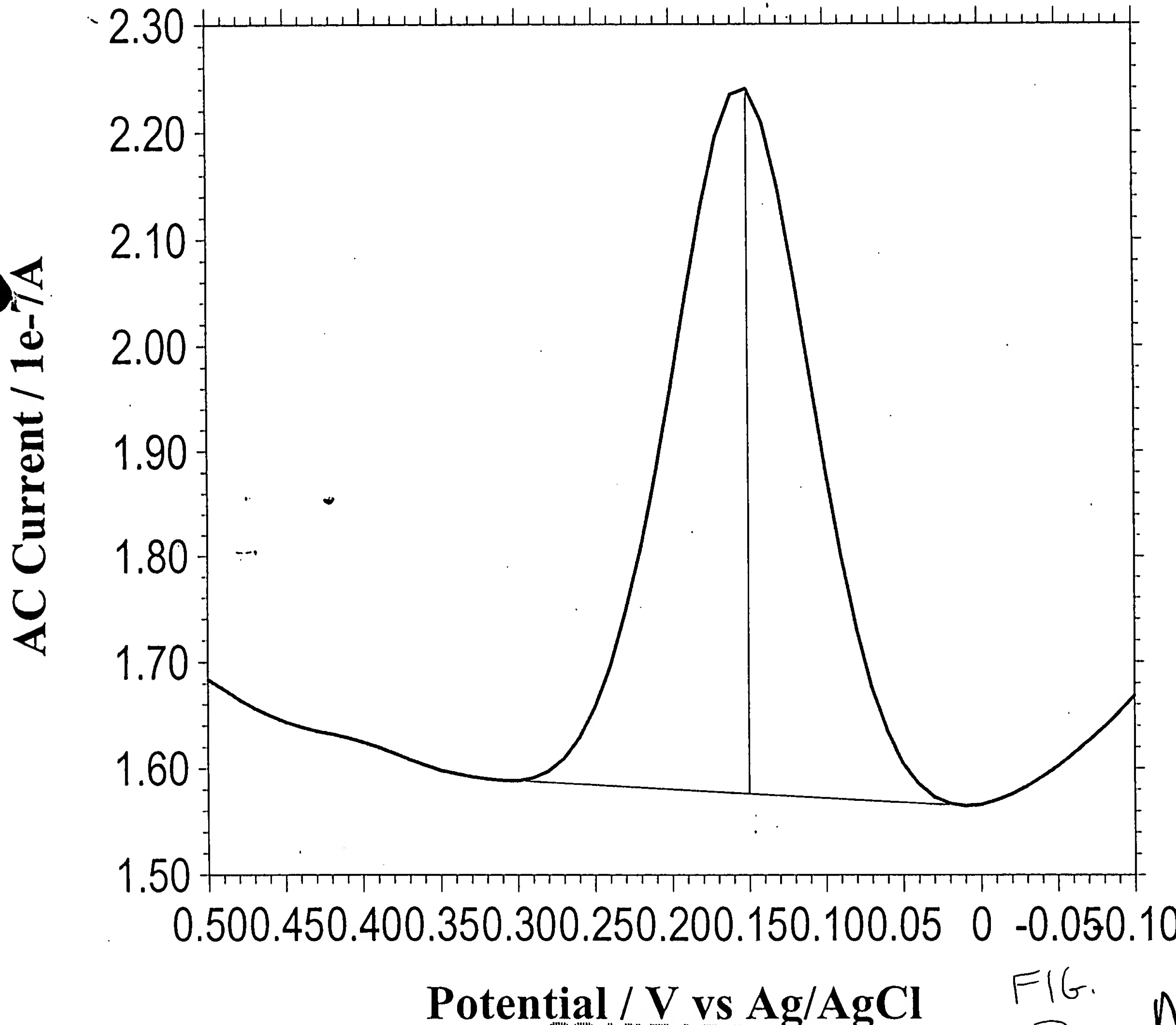
Apr. 6, 1998 13:58:20
Tech: ACV
File: u059_013

Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 1e-6

Ep = 0.140V
ip = 2.449e-8A
Ap = 1.706e-9VA

FIG. 20 L

Electrode #63



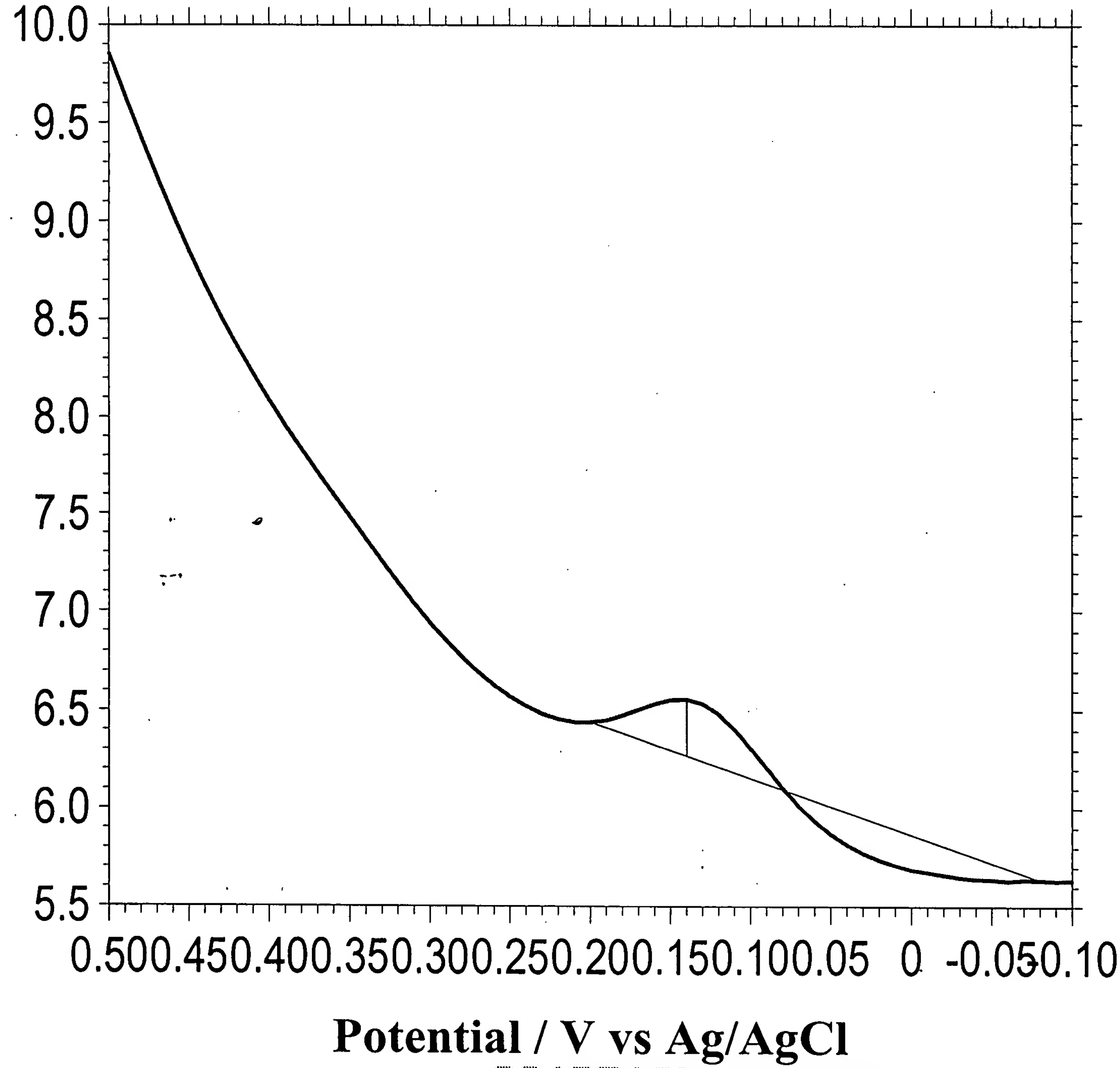
Apr. 3, 1998 18:02:37
Tech: ACV
File: g200_033

Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

Ep = 0.150V
ip = 6.637e-8A
Ap = 7.335e-9VA

FIG. 20 M

Electrode #25



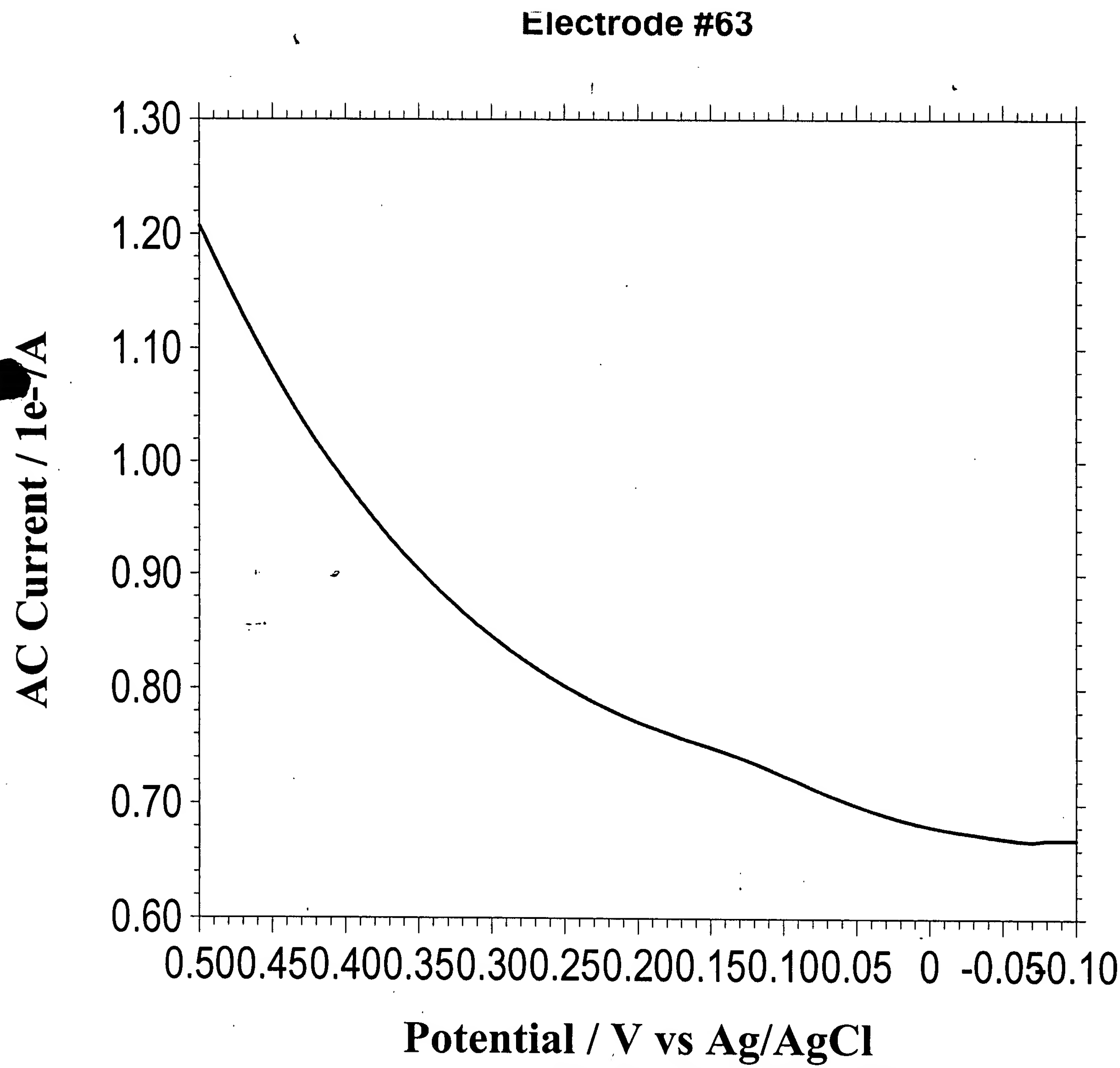
May 21, 1998 15:52:41
Tech: ACV
File: a367_007

Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

Ep = 0.140V
ip = 2.877e-9A
Ap = 2.056e-10VA

FIG. 20N

09135182.081798



May 21, 1998 16:44:35
Tech: ACV
File: a367_020

Init E (V) = -0.11
Final E (V) = 0.5
Incr E (V) = 0.01
Amplitude (V) = 0.025
Frequency (Hz) = 10
Sample Period (s) = 1
Quiet Time (s) = 2
Sensitivity (A/V) = 2e-7

FIG. 20

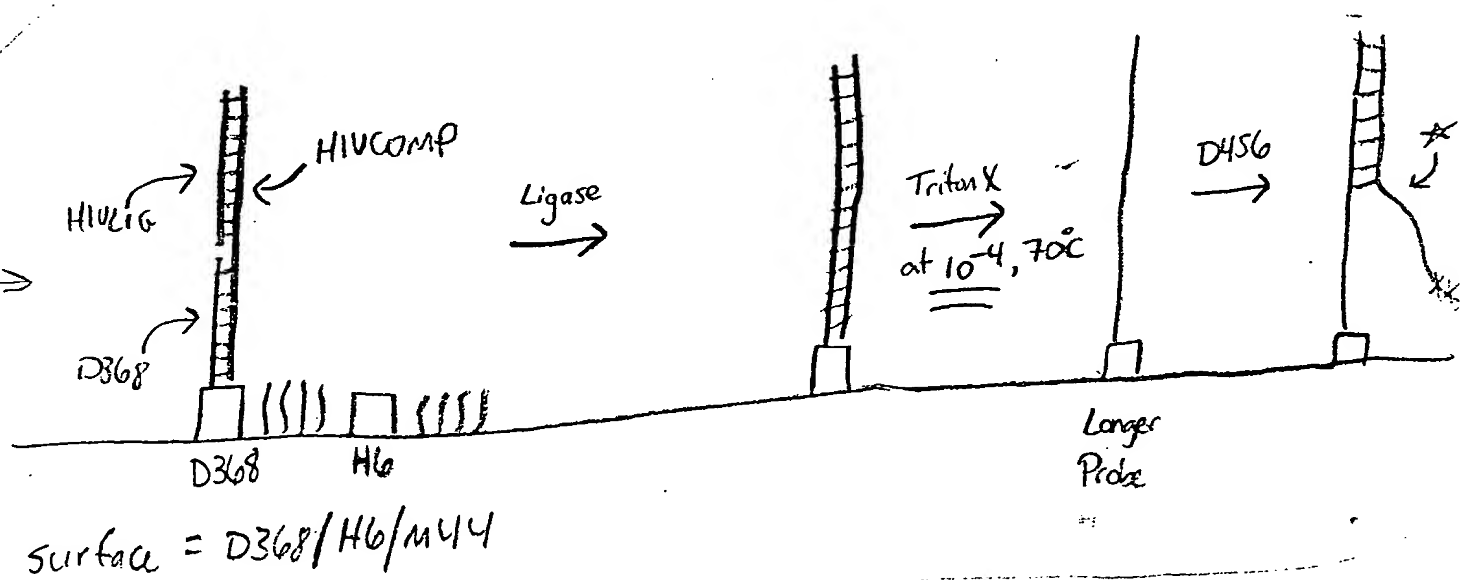
Sequences for Ligation Experiment

D456
5' – (N6)G(N6) CT(N6) C(N6)G (N6)C(N6) TTC TGC ACC GTA GCC ATG AAA GAT TGT ACT GAG – 3'

D368
5' – (H2)CC TTC CTT TCC ACA U – 4 UNIT WIRE (C11) – 3'

HIVCOMP
5' - ATG TGG AAA GGA AGG ACA CCA AAT GAA AGA TTG TAC TGA GAG ACA GGC TAA TTT TTT AGG GAA GAT CTG G – 3'

HIVLIG
5' – CCA GAT CTT CCC TAA AAA ATT AGC CTG TCT CTC AGT ACA ATC TTT CAT TTG GTG T – 3'



* this detachment point is above the ligation point, so that a surface probe that was not ligated would not signal.

FIG. 21

[illegible] Old 8-Fc, 20-Fc, and 40-Fc signalling molecules

Measurer	File	Electrode #	Hybrid code	ip (nA)	Average ip (nA)	STDEV ip (nA)	Potential (mV)	Other ip's ip (nA)	Potential (mV)
A	1	7	1- EU2+reg helpers+reg system	0	0.36	0.71	--	1.593	70
B	3	8		0			--		
B	4	6		0			--		
JB	3	5		1.42			60		
A	2	3	1+ rRNA EU2+reg helpers+reg system	0.7449	0.63	0.29	160		
B	1	4		0.196			140		
JB	1	1		0.8547			160		
JB	2	2		0.722			160		
A	5	13	2- EU2+EU1, 2 reg helpers+re system	0.3146	0.19	0.17	160	0.2506	70
A	6	15		0.3441			170	0.8442	80
JB	4	14		0			--		
JB	6	16		0.11			160		
A	3	11	2+ rRNA EU2+EU1, 2 reg helpers+reg system	0.586	1.06	0.51	170	0.05	70
A	4	12		1			160		
B	2	9		1.6			150	2.4	50
A	8	22	3- (2) 20-Fc ETMs+reg system	2.661	3.03	2.99	160		
B	5	23		0.9			160	2.8	120
B	8	24		1.2			160		
JB	7	21		7.376			150		
A	7	18	3+ rRNA+ (2) 20-Fc ETMs+reg system	1.756	2.99	2.76	170	0.4778	350
B	6	19		0.77			120		
B	7	20		7			150		
JB	5	17		2.448			160		
A	11	29	4- (2) 40-Fc ETMs+reg system	1.426	2.42	1.11	180	0.1	70
B	10	32		3			150		
B	11	31		3.7			150		
JB	9	30		1.571			170		
A	9	25	4+ rRNA+(2) 40-Fc ETMs+reg system	12.49	7.46	4.16	160		
A	10	26		9.278			160		
B	9	28		4			130		
JB	8	27		4.088			150		

Fig 23A

09135183 .091798

Fig 23B

Measurer	File	Electrode	Hybrid Code	$2/\pi * i_p$ (nA)			E_0 (mV)	Peaks w/E_0 < 160 mV	
				Raw Data	Average	STDEV		$2/\pi * i_p$ (nA)	E_0 (mV)
JZ	2	46	5-	1.041	1.93	1.25	170	4.465	60
A	3	47		2.811			170		
A	1	41	5+	5.7	3.39	2.03	170		
JZ	1	43		1.862			170		
A	2	44		2.613			180	0.96	60
A	5	53	6-	0.6566	2.23	2.55	170	2.1	60
JZ	5	55		0.8548			170		
A	6	56		5.167			180	1.64	60
JZ	3	49	6+	5.799	5.82	2.64	170		
A	4	50		8.468			180		
JZ	4	52		3.187			160		
JZ	7	61	7-	0.1988	0.73	0.60	160	1.147	60
A	8	62		1.382			170	1.04	50
JZ	8	64		0.6104			160	0.1958	60
JZ	6	58	7+	1.459	1.25	0.29	160		
A	7	59		1.042			160	2.38	60
JZ	10	70	8-	0.3208	0.56	0.34	160	0.504	60
A	11	71		0.7994			190	2.22	60
A	9	65	8+	3.297	2.54	0.94	170		
JZ	9	67		1.492			160		
A	10	68		2.841			170	0.71	60
JZ	12	76	9-	1.215	1.22	#DIV/0!	170	4.414	50
JZ	11	73	9+	3.768	4.68	1.29	170	0.7741	50
A	12	74		5.592			170	0.53	60
JZ	14	78	10-	2.842	5.12	3.22	170	2.319	50
A	14	80		7.4			170		
A	13	77	10+	5.582	4.96	0.88	170		
JZ	13	79		4.337			160	3.173	50

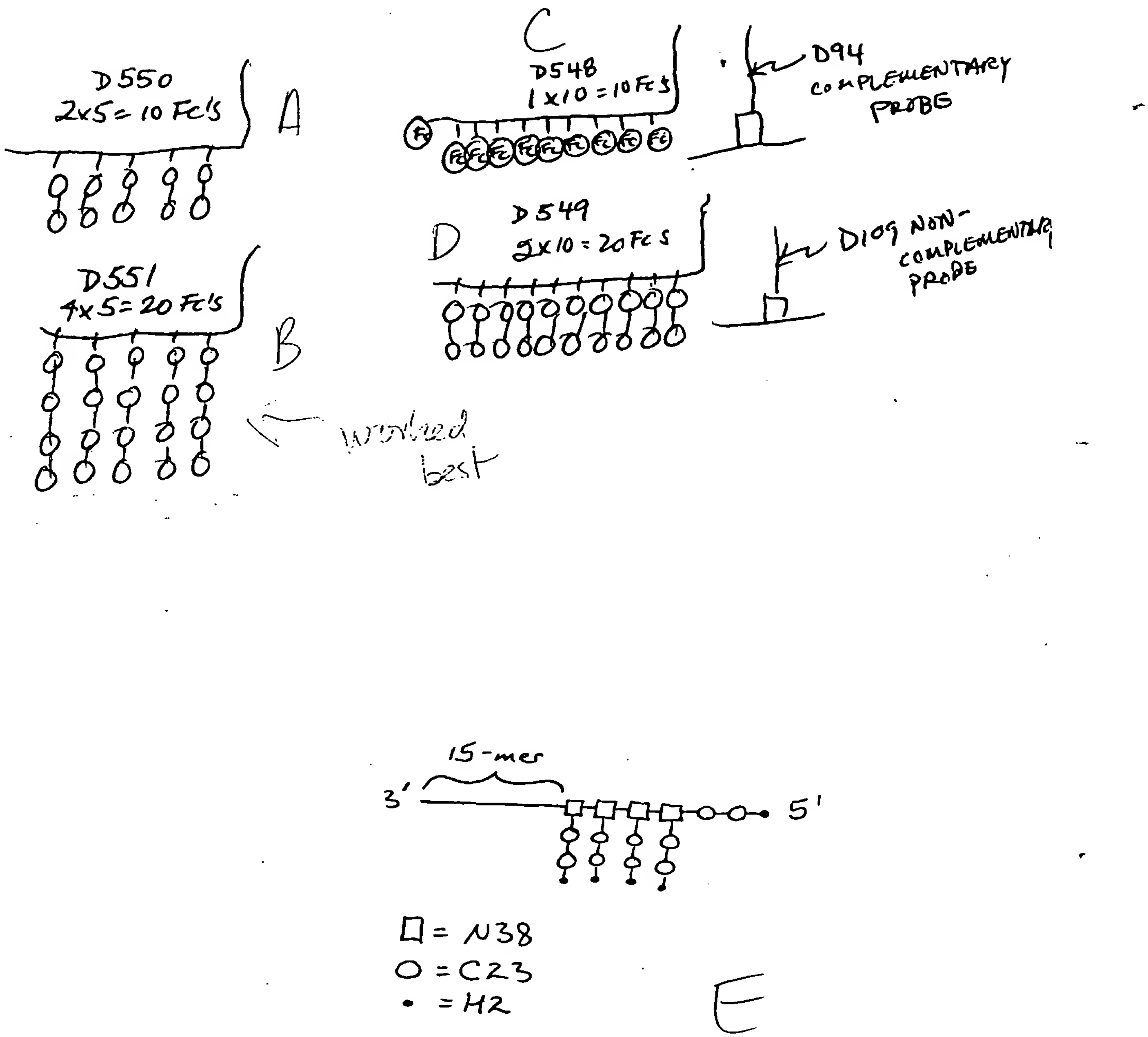

D550
2x5 = 10 Fc's
A
D551
4x5 = 20 Fc's
B
worked best
C
D548
1x10 = 10 Fc's
Fc
D94 COMPLEMENTARY PROBE
D
D549
2x10 = 20 Fc s
D109 NON-COMPLEMENTARY PROBE
15-mer
3'
5'
□ = N38
○ = C23
• = H2
E

Fig 24

Fig 24 cont

F

Bristle-Attached Fc's); ν = 10 Hz, ε = 25 mV

measurer	expt	file	electrode	surface	hybrid	$2/\pi * i_p$ (nA)	E_0 (mV)	average $2/\pi * i_p$ (nA)	STDEV $2/\pi * i_p$ (nA)
A	409	1	1	**"+" surface** 2:2:1 D94/H6/M44*, total thiol = 833 uM	D548 (1x10)**	22.6	150	14.5	5.8
A	409	17	17			9.622	200		
Z	73	8	8			14.51	100		
Z	73	22	24			11.15	110		
A	409	8	7		D549 (2x10)	53.52	200	60.6	12.9
A	409	22	23			71.13	220		
Z	73	1	2			71.66	110		
Z	73	17	18			45.9	120		
A	409	4	3		D550 (2x5)	72.4	190	45.5	18.9
A	409	18	19			30.67	210		
Z	73	7	6			44.49	120		
Z	73	19	22			34.43	120		
A	409	7	5		D551 (4x5)	105.8	210	74.9	23.5
A	409	19	21			48.66	230		
Z	73	4	4			70.42	130		
Z	73	18	20			74.77	130		
A	409	9	9	**"-" surface** 2:2:1 D109/H6/M44*, total thiol = 833 uM	D548 (1x10)	5.665	200	1.6	2.7
A	409	25	25			0.6443	250		
Z	73	16	16			0.0864	120		
Z	73	30	32			0	–		
A	409	16	15		D549 (2x10)	10.24	230	8.3	5.9
A	409	30	31			14.57	260		
Z	73	9	10			7.881	130		
Z	73	25	26			0.5476	140		
A	409	12	11		D550 (2x5)	4.513	230	3.7	1.6
A	409	26	27			4.264	260		
Z	73	15	14			4.553	150		
Z	73	27	30			1.314	140		
A	409	15	13		D551 (4x5)	10.31	240	9.0	6.9
A	409	27	29			17.46	280		
Z	73	12	12			7.445	160		
Z	73	26	28			0.8812	90		

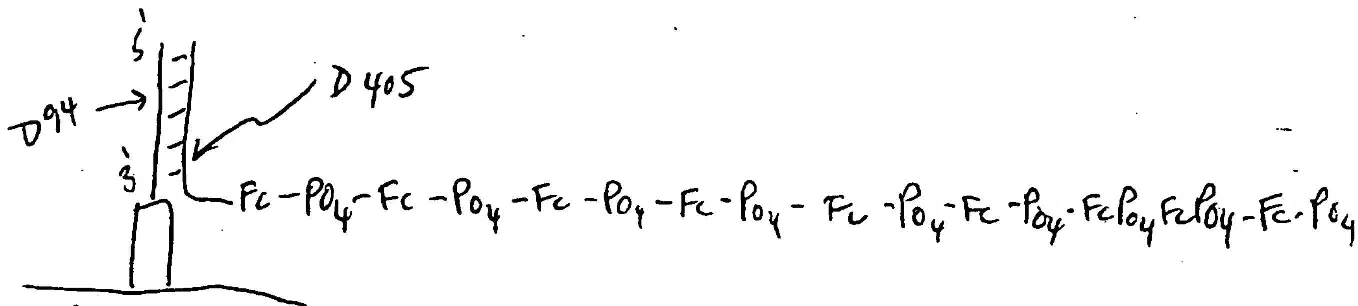
* Note: M44 = M43. ** Also note: (n x m) means there are m bristles, each with n Fc's.

Base-Replacement Fc's (June 3, 1998); ν = 10 Hz, ε = 25 mV

measurer	expt	file	electrode	surface	hybrid	$2/\pi * i_p$ (nA)	E_0 (mV)	averag $2/\pi * i_p$ (nA)	STDEV $2/\pi * i_p$ (nA)
A	52	1	1	"+" surface 2:2:1 D94/H6/M44*, total thiol = 833 uM	10 uM D405 in 6x SSC w/50% FCS	4.81	170	18.04	14.53
A	52	4	3			20.63	180		
Z	384	1	2			37.42	170		
Z	384	4	4			9.31	160		
A	52	7	5	"-" surface 2:2:1 D109/H6/M44*, total thiol = 833 uM	10 uM D405 in 6x SSC w/50% FCS	0.1	160	3.12	4.70
A	52	10	7			9.97	160		
Z	384	5	6			0	--		
Z	384	8	8			2.425	180		

* Note: M44 = M43.

B



A

Fig 25

p4 exp'l

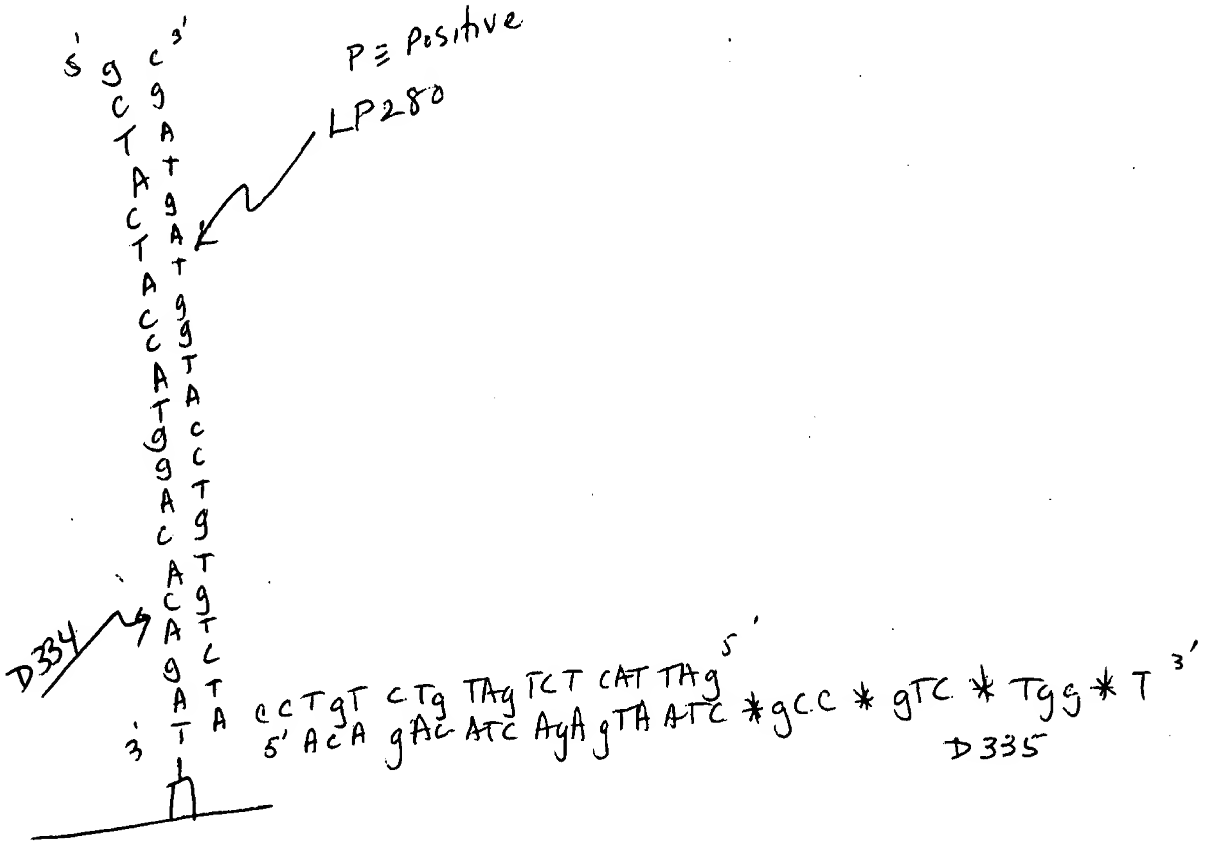

P ≡ Positive
LP280
5' g C T A C T A C C A T g g A C A C A g A T 3'
3' c g A t g A t g g T A c c T g T g T C T A
ccTgT cTg TAg TCT CAT TAg 5'
D334
5' ACA gAC ATC AgA gTA ATC *gCC *gTC *Tgg *T 3'
D335

Fig. 26A

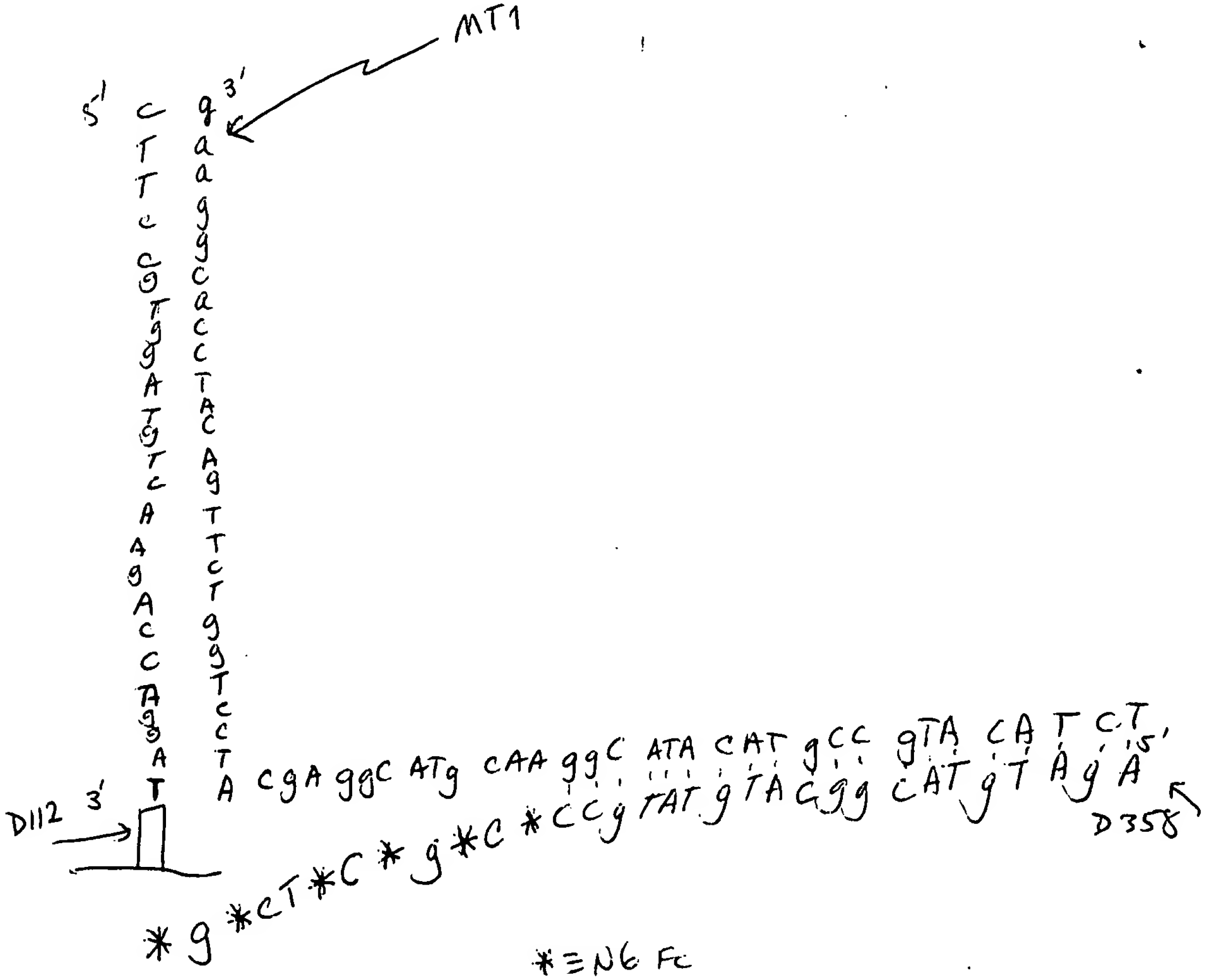


Fig. 26B

09135193.081798

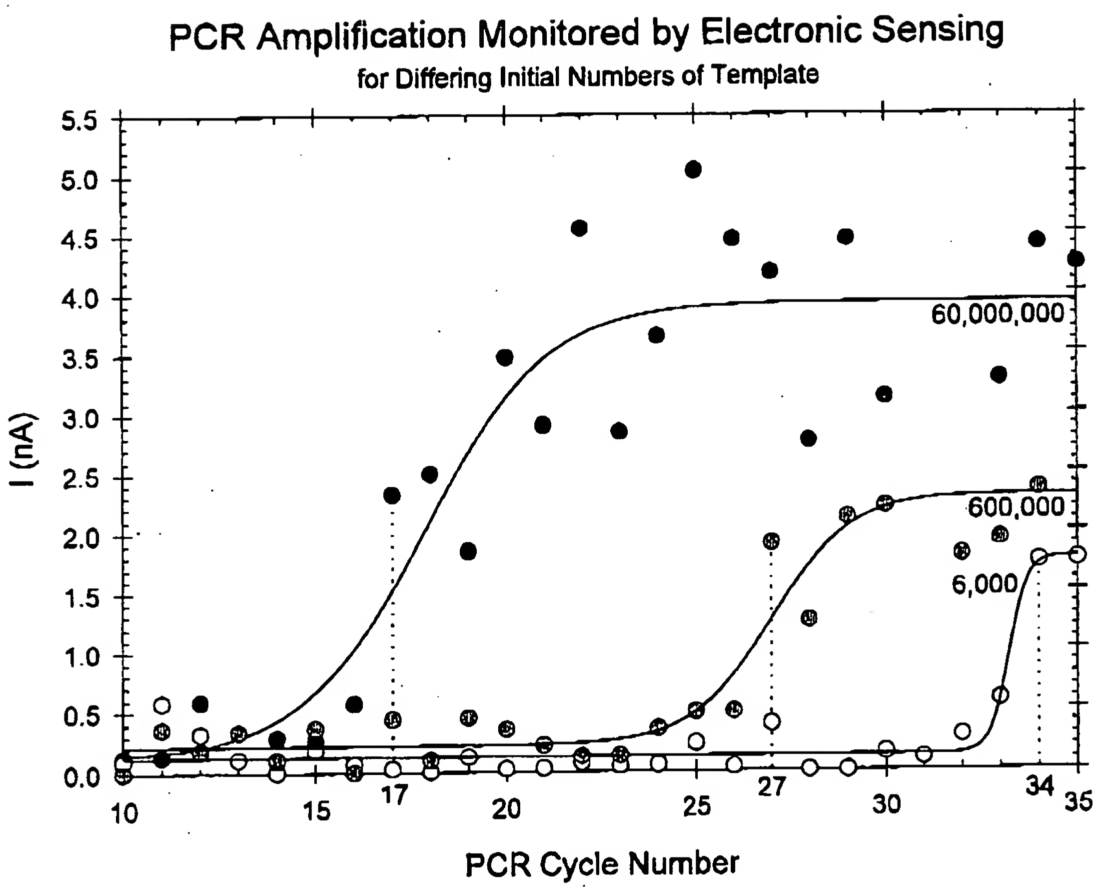

PCR Amplification Monitored by Electronic Sensing
for Differing Initial Numbers of Template
I (nA)
PCR Cycle Number
60,000,000
600,000
6,000
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
10
15
17
20
25
27
30
34
35

Fig 27